

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXIII: No. 26.

New York, Thursday, June 26, 1879.

\$2.50 a Year, Including Postage.
Single Copies, Ten Cents.

Beehive Coke Ovens.

The increasing demand for coke for industrial and domestic purposes, invests the details and economies of its manufacture with much importance, especially for the iron and steel industries. In *The Iron Age* of May 1, 1879, we printed an admirable essay on the merits of the two prominent types of ovens used in this country. The author, Mr. John Fulton, of the Cambria Iron Co., showed in a lucid and comprehensive manner that, for blast furnace use, the product of the beehive oven possesses superior merits which more than counterbalance increased cost of manufacture. The beehive oven, as compared with its rival,

on centers, as the right-hand oven shows, is 6 feet 10 inches, the diameter of the charging hole being 1 foot.

The Bennington coke ovens are placed in a double row, inclosed between two strong retaining walls of sandstone masonry. Between these walls and up to level of the floors of the ovens, the space is carefully filled and compactly rammed with clay and loam, constructed in horizontal layers of 12 inches each. Under all, an ample drain is laid longitudinally under the bank of ovens. The ovens are founded on this thoroughly packed filling, having a fall in their floors toward the doors of 6 inches to each oven. They are constructed of three different shapes of 9-inch fire brick ($9 \times 4 \frac{1}{2} \times 2 \frac{1}{2}$;

These sections are supported at this base by small benches, easily adjustable, and supported under crown by a single post, capped by a circular collar. The sections were made of a size to be easily taken out through the oven doors.

The fourth operation consists in building the dome, which is completed by wedging in carefully and firmly the annular charging ring, which becomes a keystone of the arch as well as the charging hole of the oven.

The filling in around ovens, or backing, should follow the progress of the brickwork as closely as possible; the material laid down in horizontal layers of inches deep, and carefully rammed. The track on top of ovens is laid with iron tie pieces, and has a

mined by Mr. T. T. Morrell, chemist, Cambria Iron Company, is as follows:

Fixed carbon	68.50
Ash	8.00
Volatile matter	22.38
Sulphur	1.12
Coke	100.00
	76.00

A yield of 65 per cent. indicates a loss of carbon of 9.7 per cent. only, which shows commendable economy in the work of these ovens. In this respect it is interesting to compare the loss of carbon in coking this coal by the three typical methods:

	Per cent.
In pits or mounds, 50 pr ct. coke; loss carbon	22.0
In Beehive ovens, 65 pr ct. coke; loss carbon	9.7
In Belgian ovens, 70 pr ct. coke; loss carbon	8.0

ful coking operations. The mere effort to save a few units of carbon in the coking to waste a great many in the furnace, besides reducing its product, seems to be only trifling with a very important industrial question. For instance, a furnace that used 1.80 tons of Belgian and pit coke mixed in making one ton of pig iron, required only 1.52 tons of Bennington beehive coke in doing the same work, under precisely the same conditions of work and weather. This exhibits a loss of 53-100th ton of coke to each ton of pig metal produced, which in a large make would be quite serious.

Careful investigations of the several methods of coking indicate very decidedly the superior value of the Beehive plan. It

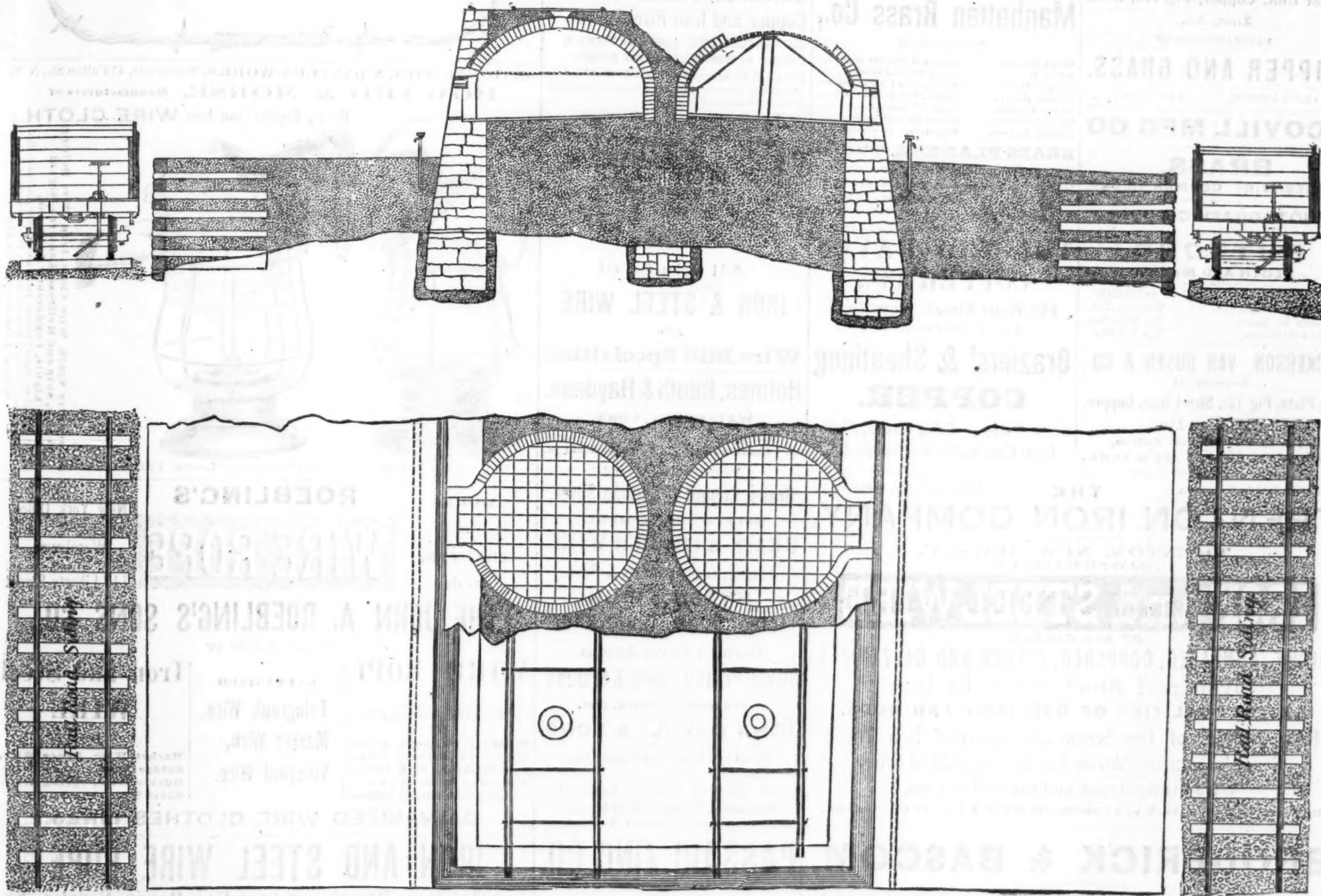


Fig. 1.—Section and Plan.

the Belgian oven, is cheaper in first cost of construction, while, on the other hand, the annual expense of repairs is greater. Nevertheless, so far as present developments have gone and current practice shows, the beehive oven is evidently the apparatus for the manufacture of blast furnace coke, and the following description, with the accompanying illustrations, of an approved modern plant of beehive ovens, which we take from the report of the Bureau of Industrial Statistics of the State of Pennsylvania for 1877-78, will be found of interest. The paper was prepared by Mr. John Fulton. It gives the following description of a bank of 100 beehive ovens constructed at Bennington shaft colliery, for the purpose of making coke to supply the five blast furnaces of the Cambria Iron Co.

These ovens are located a short distance east of the eastern portal of the Allegheny tunnel of the Pennsylvania Railroad. The bank of ovens is 750 feet long, with ample wharf and railroad siding on each flank. The coal is received from the Miller seam (B) of the Bennington shaft mine. A large dump has been erected, in connection with the shaft tower of the mine, capable of holding three days' supply of coal, and of sufficient height to discharge its coal into larries on tracks underneath. These larries receive five tons each, and discharge it through their hopper into the coke ovens.

The ovens are circular, the diameter being 11 feet 6 inches; they are 6 feet high from the level of the floor to the crown of the dome, the charge filling the oven as far as the dotted line in the left completed oven. The radius of the dome, which is built up

$9 \times 4 \frac{1}{2} \times 2 \frac{1}{2}$; $9 \times 4 \frac{1}{2} \times 2 \frac{1}{2}$; $9 \times 4 \frac{1}{2} \times 2 \frac{1}{2}$.)

The order of the work of construction consisted in four consecutive operations.

1. The setting up on front walls of the iron door frames, with the necessary anchors built up with the shaped jamb brick.

2. The building of the vertical circular section to the springing of arch or dome—the circular line of oven being preserved by a wooden sweep, pivoted on a pin in center of oven.

3. The laying of the 3-inch floor tiles and the erection of the wooden centers to build dome of ovens. These wooden centers consist of seven sections made of boards and laths, which are shaped and fit together like the sections of an orange, when cut by a plane at right angles to its stem line.

gauge of 6 feet to allow space for larrie containing 5 tons of coal. The water for quenching the coal is supplied by 3-inch cast-iron pipes, with taps and hose between ovens.

The ovens were erected, rapidly and carefully, under the superintendence of Mr. V. C. Elder, of Johnstown, and were put in blast October 8, 1878. They have been working satisfactorily since. In relation to their work, Mr. John McFadyen, superintendent of coke ovens, reports that during the months of December and January last, 10,227 tons coal have been coked, yielding 6548 tons of coke. This shows a yield, even in the winter months, of 64.05 per cent. of coke, and, it is believed, assures an average annual yield of 65 per cent. The analysis of the Miller (B) Bennington coal, as deter-

The pits or mounds are the slowest in time and the most wasteful of coal. The Beehive ovens make the best and driest coke, but are not yet so economical in their work as the Belgian. In time of making coke they are about equal. The actual cost of making coke per ton by these methods at present cost of labor, including interest on investment in ovens, is as follows:

Pits or mounds	70/100
Beehive ovens	35
Belgian ovens	33

In this stage of the investigation of the methods of making coke for blast furnace use, it is important to bear in mind that the imperative requirement is the production of the best quality of coke for furnace use. This must be the prime factor in all success-

seems to be pretty clearly made out that this is the true fundamental principle of coking. In this connection it may be asked why cannot coal be coked with as little loss of carbon in the Beehive as in the Belgian or Appolt plan of ovens. The correct reply to this would disclose the true line of progress demanded in Beehive ovens—the production of the best possible furnace coke with the least possible waste of carbon.

It is evident that a great waste of heat is induced in the present plan of Beehive ovens. The only surprise is that the system is not much more wasteful. The heated products of coking are driven directly out of the oven through the charging holes into the open air. The Belgians, on the other hand, are enveloped in flues and ports, utilizing as much as possible the heat evolved in coking. Their rapid system of discharging the coke retards the work of the oven very little, while the Beehive, quenching its coke in oven, is much cooled by the operation, besides a loss of time in drawing the coke of two to three hours. Yet under all these disadvantages the Beehive ovens will make coke of a better quality than the Belgian or Appolt ovens.

During the progress of the construction of the Bennington ovens, Mr. McFadyen suggested the plan of adding flues to the Beehive oven. The heat is received by ten ports, near crown of oven dome, and carried down outside in buttressed flues, and conveyed under the floor of ovens in radial flues, discharging into a short chimney, regulated by a damper. Careful experiments in this oven show a decided saving of time in coking. At present this is estimated at

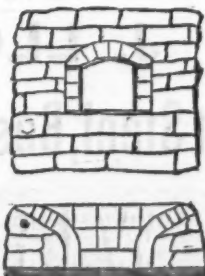


Fig. 2.—Oven Door.

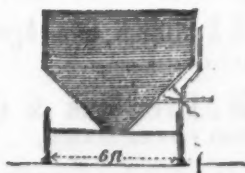


Fig. 3.—Charging Larrie.



Fig. 4.—Section of Door.

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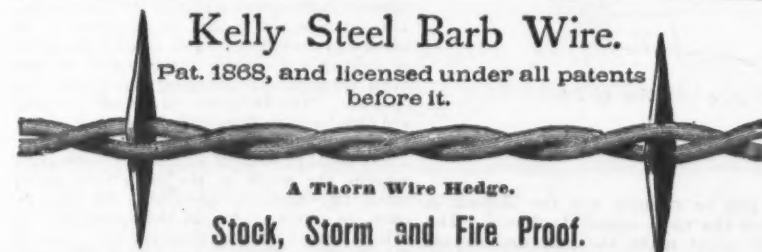
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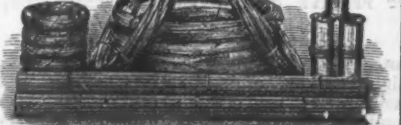
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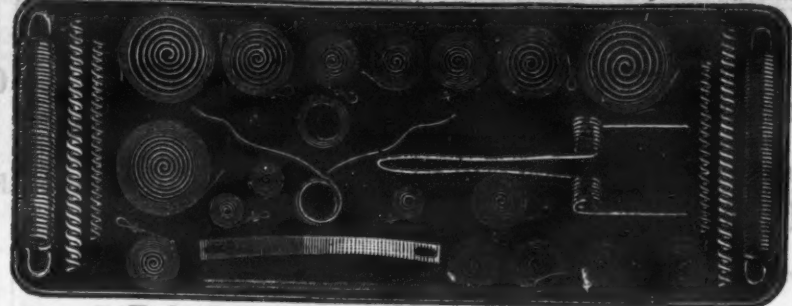
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33 per cent. That is, a bank of 200 ovens with flues would produce as much coke as a bank of 300 ovens without flues. In the erection of banks of ovens of Beehive with flues, it is contemplated to introduce an elliptical flue between the backs of ovens, with ports to receive the heated products.

Mr. M. F. Overholt, of Mt. Pleasant, Pennsylvania, in the Connellsville coke region, also submitted an improvement to compensate for the loss of time in the quenching of coke and drawing involved in the Beehive ovens. He has introduced a connecting flue between the ovens regulated by a damper, so that, on drawing a charge of coke, the ports into adjoining ovens can be opened, and a supply of their heat obtained to assist the drawn oven in regaining its heat. This application would be important in ovens where coals are coked possessing a small volume of volatile matter.

The cost of Beehive ovens, in favorable situations, should not exceed \$200 each; but, where deep embankments are required, a largely increased outlay will be demanded. The flued Beehive oven of Mr. McFadyen would probably cost \$50 more than common unflued ovens.

It is very remarkable that, after long-continued efforts in elaborating complicated coke oven appliances, the ultimate analyses of the value of the methods should evolve the merits of the simple plan of the Beehive ovens of fifty years ago. There is no doubt that particular varieties of coking coals require special treatment, but underneath this lies the important consideration, whether it is a correct business principle to attempt the coking of a coal that requires so complicated appliances, and which, after all, produces an inferior coke. It would appear that in the State of Pennsylvania, possessing such ample supplies of good coals for making coke, an intelligent selection of such coals is the first and important consideration in coking operations, rather than the attempt, however ingenious, of designing ovens to make inferior coke from coals normally unfit for this special purpose.

American Trade in Russia.

The rapid growth of our manufacturing industries has obliged us to seek an outlet in foreign countries for the daily increasing excess of our production over our consumption. We have already obtained a firm footing in many markets, from which, only recently, we were entirely excluded. But in order to maintain and develop the advantage gained, it is necessary that we should have a thorough knowledge of the requirements of the markets to which we send our goods, and all information on this point is valuable. We think, therefore, that no apology is needed for the extracts we give below, from a recent report of Mr. W. H. Edwards, Consul-General at St. Petersburg, Russia:

The increased receipts from railways during the year 1877 over the preceding year, is doubtless due in a great measure to the increased traffic caused by the transportation of troops and army supplies.

The extension of railways in Russia, between the year 1860 and 1878, has had the effect of bringing much larger quantities of produce to the ports, and more rapidly, and has thus increased the producing as well as the purchasing powers of the nation. The increased capital accumulated from transactions thus brought about has, to a great extent, been reinvested in the construction and extension of factories and machinery to meet the increasing demand of the home market and the expanding demand of the Eastern market.

The foremen of the workshops, mills and manufacturing are to a great extent supplied by England and Germany, which fact greatly aids the manufacturers of those countries in maintaining the control of these markets in the several classes of machinery.

On the 6th day of November, 1878, the Ministry of Ways and Communication issued an order to the inspectors of railways, directing them to notify all railway companies over whose roads are transported mineral combustibles and other weighable merchandise amounting to 500,000 pounds per year, to establish scales of sufficient capacity for the weighing of laden cars. Fairbanks, Falcot's and Howe's scales will be used.

In the mountainous regions of the Caucasus, in the neighborhood of the port of Baku on the Caspian Sea, petroleum is extensively found and is believed to exist in great quantities. The question as to whether future energy and enterprise will develop its extraction to such an extent as to prevent the further importation of American petroleum to this country, and to meet our producers in the markets of Europe, is one which at least merits the consideration of our home trade.

As the Caucasian provinces are the only known regions from which our producers have heretofore feared competition, I have deemed it proper to make as thorough an investigation of the subject as my opportunities would permit, and as a result of my inquiries from trustworthy sources, I find that the history of the extraction of mineral oil in the Caucasus may be divided into three distinct periods. From 1859 until 1872 this branch of production continued a monopoly in the hands of a single company or individual, and the amount extracted did not perceptibly increase. From 1872 to 1877 the extraction was free from the rule of the monopoly, but subject to a government tax. During this period the extraction gradually but slowly increased. Since January 1, 1877, this industry has been entirely free, and the production has been favored by a duty of 7 cents a gallon on American petroleum. American petroleum has not, however, ceased to make progress in this market, and is now in greater demand at \$1.15 per pood (36 lbs.) than the home production at 60 cents per pood. The cause of this progress may be assigned entirely to the quality of the American oil, which is far superior to the Russian oil for illuminating purposes. The Russian oil has a pungent smell, and smokes to such an extent as to render its use objectionable.

One of the most serious difficulties met with by the explorers of petroleum in the Caucasus, and a difficulty which has heretofore retarded the progress of their work, was want of proper and economical means of extraction. The geological formations are so different in character from those met with in the oil regions of Pennsylvania, that the improved machinery in use there was not, in many respects, adapted to the geological formation found in the Caucasus. The labors of experienced petroleum miners from the oil regions of Pennsylvania, with their improved machinery, and the labors of purely scientific geologists, have been combined, and better practical results will doubtless be obtained. It is, however, the belief of experienced oil men that the character of this oil has been fully determined, and that future explorations of a greater depth will result in finding the same quality of oil. Great efforts are being made to introduce economical and efficient means of extraction; but the most serious obstacle to be overcome is the want of proper, regular and economical means of transportation. The oil is at the present time transported in floats from Baku, on the Caspian Sea, to Astrakan, at the mouth of the Volga; thence, up the river Volga, to Nijni Novgorod; thence, by river and canal, to St. Petersburg, a distance of 2250 miles. The cost of transportation from the point of extraction to the northern markets of this Empire is greater than the cost of the transportation of the American oil to the same markets.

The Russian market may in time be closed to the importation of American oil by a well-directed protective duty; but, in my opinion, there is at present nothing to lead to the conclusion reached by some, that the consumption of petroleum in this country cannot keep pace with the production. Mechanical skill has accomplished so much, by the extension of railways, in developing, cementing and binding the distant territories of our own country, and railways play so great a part in modern warfare, that it seems to me hazardous to attempt to scan the future development of the mineral resources of the Caucasus, or the future march of improvement in this vast Empire, whose security depends so much upon the facility of its internal communications.

American sewing machines have an extensive sale in this country, but at the present time are meeting with a strong competition from the hand machine of German manufacture. The growing popularity of the German machine is said to be due to the widespread belief that it is injurious to the health to work the American foot machine. By the imposition of protective duties on foreign manufactures the government has extended a judicious encouragement to home capital, in order to enable the domestic industries to become firmly established and profitable.

The law of Nov. 16, 1876, required all customs duties on and after Jan. 1, 1877, to be paid in gold, and as these duties are levied by weight and the rate determined according to the quality and value of the goods, the system has virtually closed this market to all foreign manufactured commodities, except certain luxuries, machinery for the construction and extension of railways, mills, factories and workshops. The various manufacturing industries of the country have thus been stimulated. Agricultural machinery being free from duty was not affected by this law, and the low tariff on machinery in general has been a great help to the manufacturers, for the capacity of the home machine shops is not sufficient to supply the demand for any class of machinery.

The present protective policy of the government, which has given home manufacturers the monopoly of the home market, is not limited in its protecting supervision to the mere regulation of customs tariffs, but extends an able direction over internal ways of communication which is gradually bracing all industries and making them prosperous. The present external debt of the country must not be taken as a just measure of the condition of its industries.

Within the last few years there has been an astonishing increase of the internal trade of the Empire, due not more to the enormous increase of the facilities for freight and traffic and the growing prosperity of the lower classes, than to the able direction by the government of the ways of communication. The railways, canals, &c., are under the immediate control and management of the government, consequently there are no strikes or disputes between the companies and their employees; no derangement of commerce by organized combinations; no unjust classification of goods; no excessive rates; no general disregard for the interests of the producer, manufacturer or trader; no feeling among the producers that they are working for the purpose of making dividends for railway proprietors; and therefore no real grievances which are likely to lead to serious loss or breaks in the continuity of trade. Surely this state of affairs offers great encouragement to capital and excellent facilities to the commercial community.

Among the important measures already proposed looking to the advancement of the agricultural and industrial interests, is the further development of the internal means of communication and the introduction of improved machinery of all kinds.

The insufficiency of the present means and facilities for manufacturing is acknowledged. The English manufacturers study this market with great diligence. The following figures tell their own story:

Russia imported from England during the year 1877 hardware and cutlery, \$253,641; steam engines and mill machinery, \$452,057; other machinery, \$1,714,100. During the year 1878 Russia imported from England hardware and cutlery, 440,404; steam engines and mill machinery, \$812,641; other machinery, \$3,948,899. As the increase of production of cotton goods in the United States, due to improved methods, was from 1865 to 1875 100 per cent., and in England, during the same period, only 23 per cent., I can see no good reason why American machinery should not find a market here, provided its merits are properly represented.

England and Germany maintain their control of this market in all kinds of machinery and tools by a judicious adaptation of style, model and quality, to the tastes of the pur-

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For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel..... 7.00
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For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.
Printed instructions for obtaining proper average samples for analysis furnished upon application.

Connellsville Coke.
FRANCIS WISTER,
320 Third Street, Philadelphia.
Best Coke for Furnaces and Foundry Use.

chasers, of which they have made a special study, and to which they can conform with advantage and profit by reason of the convenience of the market, and direct, regular and rapid communications. The manufacturers of those countries are greatly assisted in this market by reason of their having furnished many of the foremen for the workshops, mills and manufactories.

The climate, soil and other conditions of this empire, demand the same class of machinery and labor-saving machines that exercise so much influence in the development of our own country. The farms, or estates, are large, and labor is not so cheap but what the owners would find it to their advantage to buy heavy and expensive machinery. The country has every natural gift in abundance, and there is no prejudice among the peasantry against the introduction of labor-saving implements.

The nation is, however, uninstructed in the scientific principles of agriculture, and the peasants possess no particular facilities for seizing at once what is valuable in any machine. The extension of railways, the construction of factories, the personal efforts of the landed proprietors, in presenting opportunities of comparing the new with the old methods of culture, concur in making it credible that the Russians are daily becoming more fit to determine the proportion of intrinsic merit between the no-settled system of any sort in vogue here, and the system founded upon principle and well settled upon positive evidence.

I am convinced that the knowledge and practical use of machine work may now be communicated by proper methods. The solution of the question as to how long England and Germany will maintain their control of this market, by the mere exercise of diligence in studying and supplying the special tastes and prejudices of these people, depends entirely upon the action of the American manufacturer.

I do not consider it my province to instruct manufacturers in the important duty of selecting agents, but I think it would pay them well to guard against blindly throwing their business into the hands of foreigners who are also the representatives of foreign competitors.

Energetic and efficient resident and traveling agents are the means by which a profitable and permanent trade can be established in this country. Agents selected not from the ranks of those who have been residents of the empire, and who, in a measure, partake of the tastes and preferences of the people, but fresh from our own workshops, mills and factories, possessing the necessary mechanical skill and knowledge to explain and demonstrate the value of the articles exhibited. The machines, implements and tools will, doubtless, in a majority of cases, speak for themselves, but it will greatly facilitate the work of anyone coming to this empire on such a mission, to possess some knowledge of the German language. The distribution of journals, circulars, catalogues, advertisements and the establishment of sample and sale-depots, doubtless goes far toward the dissemination of knowledge and the extension of trade with most countries; but this country has not yet learned the art of advertising, and the only means of disseminating information is by actually exhibiting the superior worth of the implements. By the judicious use of the means above stated our exporters will find in this country a ready and profitable market, and I see no good reason why the crooked stick or antique plow should not entirely disappear from the rich provinces of Russia, provided our manufacturers properly press their claims. If the exporters of American agricultural and other machinery had shown the same energy and perseverance, during the past few years, in the exhibition and demonstration to the people of this country, of the value and practical use of their improved machinery that has been shown by the gun manufacturers of America, the country would be as well stocked with improved tools of husbandry and other American machinery as it is with American arms. The necessity for the introduction of a rational system of agriculture, by the education of the people to the appreciation of the value and importance of using our labor-saving machines, is much greater to-day than was the necessity for the introduction of our improved fire-arms two years ago.

The first step toward supplying a want is the acknowledgment of the existence of that want, and those who have made the experiment of trying the new no longer hesitate to acknowledge the deficiency of the old methods.

Such reasons as those I have endeavored to explain, lead me to the conclusion that the present is an opportune moment for the American manufacturers to proceed in a systematic way to introduce their implements and machinery to the purchasers of this country.

St. Petersburg has become the chief point of the foreign maritime trade of Russia, by being connected, by means of enormous systems of canals and water routes, and later on by railways, with the most distant productive territories of the empire, situated along the Volga basin and its tributaries, the Kama, Oka, Schekena, along the Dwina to the White Sea, through the Swir with Onega and Ladoga seas, and by the Neva with the Baltic Sea. The chief Russian water route, the Volga, is united by means of canals with the Baltic Sea, thus directly connecting the interior Russian trade carried on in barges, with the foreign trade carried from the Baltic Sea abroad in seagoing vessels.

The fortunate condition of the situation of the city adds greatly to its importance. The sea has very deeply penetrated toward the interior of Russia at this point, making it the nearest point to Moscow, the heart of Russia and the center of all Russian railways.

Notwithstanding the advantages which Nature has offered, the hindrances and losses which the St. Petersburg trade, in its present condition, has to bear on account of the want of a well-constructed commercial port with docks, wharves and warehouses, are beyond computation.

The seagoing vessels come only as far as Cronstadt, 20 miles from St. Petersburg; the Volga barges stop on the Neva, 10 miles from the sea; the railways are situated on

the south side of the city, are unconnected with each other, and have their termini on the streets of the city without any connection with sea or river; finally, the custom-house is situated on the north side of the city without connection with railways, the sea or river boats, and the separate warehouses and yards are dispersed over the whole city at a great distance from all commercial routes.

Such an irregular and defective arrangement, under which the enormous commerce of this city is at present carried on, involves the existence of a crowd of forwarding agents, commissioners and other intermediaries who live upon losses of commerce resulting from the many existing obstacles.

Measures have at last been taken by the Russian government to further the construction of a commercial port in St. Petersburg, at a point where the ship, the locomotive and the Volga barge can be brought together for a direct, regular and economical interchange of goods.

The government has made important grants for the accomplishment of this great enterprise, and the work of constructing a sea canal between Cronstadt and the new port is already under way. The execution of this work has been entrusted to a well-known New York dredging company.

The government has given such substantial assistance for the carrying out of these improvements, that it is reasonable to infer that, within three years, St. Petersburg will have a well-appointed commercial port, with docks, warehouses, custom houses, &c., with all the modern appliances for loading and unloading goods, which will, beyond doubt, remove many of the existing losses from which the St. Petersburg trade is now suffering, and will add greatly to the development of its commercial activity.

Portable Fire Annihilator.

Messrs. W. & B. Douglass, of Middletown, Conn., are manufacturing a new article, recently patented, which they call a fire annihilator. It is intended to supply a want, long felt, for a means of extinguishing fires in their incipient stages. This apparatus—an illustration of which we give—consists of a powerful double-acting brass force pump, arranged with 3 feet of discharge hose pipe and a suitable nozzle, secured in a covered pail of galvanized iron. This pail holds about 2 gallons of water or chemical solution. This machine may be kept in any convenient place, and is always ready for use, as its action is positive, and it is not liable to become disabled in any way by long standing or disuse—a thing which not unfrequently happens with many forms of extinguishers dependent for their force

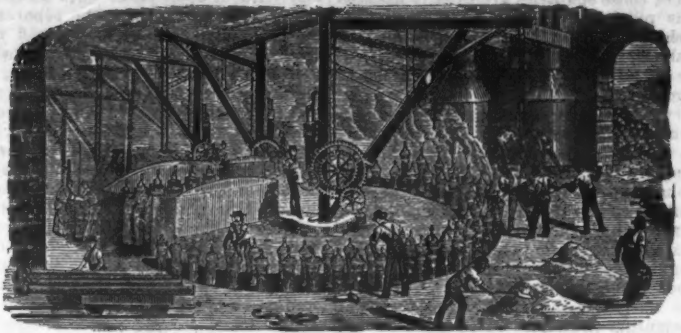


upon chemical action. The pump is very powerful, and is capable of throwing a stream 50 feet or more. No time need be lost in charging the machine, as the reservoir can be replenished by pouring water into it while working, a point of no small advantage. The action of the pump is smooth, and not at all exhausting. The annihilator is handsomely painted, and is not unsightly even when kept in a conspicuous place. A portable hand pump is invaluable in case of fire, as it is available at a moment's notice, and can be carried at once to places which are inaccessible to an ordinary hose, except after some minutes' delay. At the beginning of a fire the moments are golden, and a cupful of water is often more valuable than a powerful stream a few minutes later. These pumps can be used for a variety of purposes when it is necessary to throw liquids, as, for example, washing carriages, watering plants and shrubbery, applying solutions of various kinds, &c. In fact, pumps of this kind are very generally useful, not only in the store but in the household.

A New Anchor Line Steamer.—The additions to the fleet of European vessels sailing to New York are growing numerous, every new steamer belonging to a class of large vessels which hitherto have only been exceptions. The Anchor line has followed the example of the Cunard and Guion lines, and has contracted with the Barrow Shipbuilding Company, of Barrow-in-Furness, Lancashire, England, for a new steamer of the following dimensions: Length, 445 feet; breadth, 44 1/2 feet; and depth, 34 1/2 feet. Her gross tonnage will be 5200 tons, horsepower 3500, and the builders have guaranteed her to steam at the rate of not less than fourteen knots per hour.

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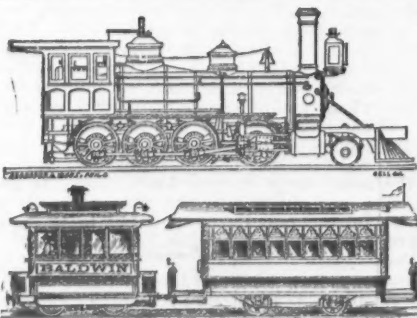
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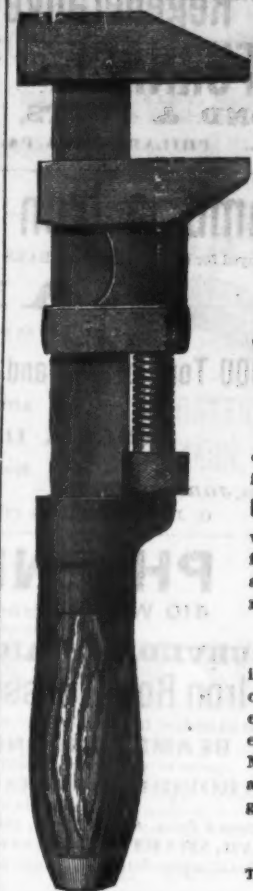
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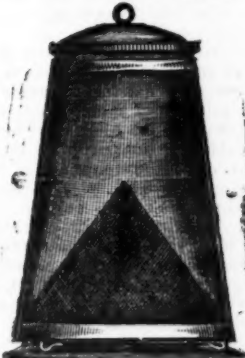
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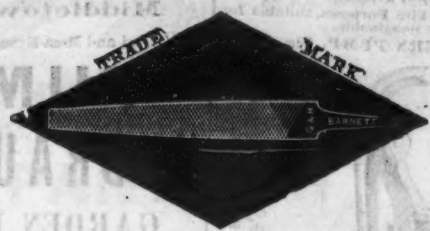
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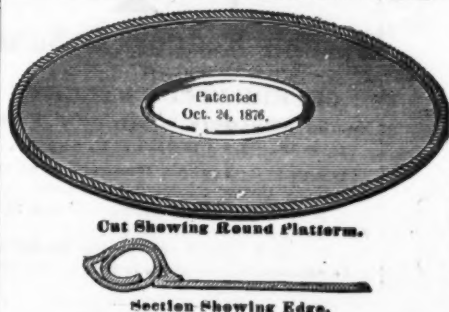
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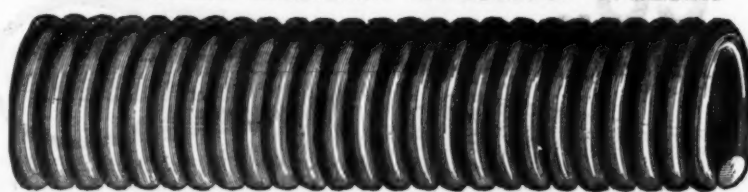
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For Packing the Piston Rods & Valve Stems of Steam Engines & Pumps. It represents that part of the packing which, when in use, is in contact with the Piston rod. A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.

This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square. JOHN H. CHEEVER, NEW YORK BELTING & PACKING CO., 37 and 38 Park Row, New York. Treasurer.



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Punches.



Roller Tube Expanders and Direct Acting Steam Hammers.
Communications by letter will receive prompt attention.
Jacks for pressing on Car Wheels or Crank Pins made to order.

The Anti-Clinker and Design Patents.

We have the following circular from Messrs. John S. Perry and Grange Sarr, Jr., trustees, giving the terms and conditions of the settlements demanded for past infringements and licenses for future use of the anti-clinker and design patents now held by these gentlemen as trustees of Perry & Co., James Spear and the Anti-Clinker Association.

[No. 1.]

IMPORTANT TO STOVE MANUFACTURERS AND DEALERS.

The undersigned take this mode of notifying the public that, by an agreement recently made by and between Messrs. Perry & Co., of Albany, Mr. James Spear, of Philadelphia, and the Anti-Clinker Association, they have become the owners, in trust, of all the so-called "Anti-Clinker" and the Design Patents (31 in number), heretofore owned or controlled by these parties in their respective separate rights, including the well-known patents of Mr. James Spear. This union of interests was rendered imperative by the conviction of the parties, forced upon them by their recent protracted suits and counter-suits, that each held patents that would control essential features in the anti-clinker organization of the modern stoves, ranges and furnaces.

This condition of things, if permitted to continue, would have proved exceedingly embarrassing to the parties themselves and to the trade generally, as eventually it would have given to each party the power to arrest by injunction the manufacture and sales of the other, and at the same time would have subjected all other manufacturers and dealers to demands for damages and royalties from two independent and rival sources. By the arrangement now made this difficulty is obviated, and the public are relieved of all uncertainty as to the direction of their accountability.

Among the more prominent of the patents thus brought under our control are those issued to the following persons: George R. Moore, patented May 22, 1866; reissued November 9, 1875; Charles H. Frost, patented July 30, 1867; reissued June 2, 1874; James Spear, patented March 1, 1870; reissued January 5, 1875; John S. Perry and Andrew Dickey, patented October 24, 1876.

A license under these and the various other patents now controlled by us will, in our opinion, secure the full and complete right to manufacture and sell anti-clinker stoves, ranges or furnaces, without the payment of any further royalty to any person or persons whomsoever; and, on the other hand, we believe that no one can make or sell an anti-clinker stove, range or furnace, of any pattern whatsoever, without infringing several of our patents.

We regard the anti-clinker grate and its concomitants as constituting the most pronounced and valuable invention relating to stoves made within the lifetime of the present business generation. No proof of this is needed other than the universal adoption of the improvement. Not only has the popularity of the invention enabled manufacturers to realize a materially increased profit upon every structure in which it has been embodied, but it has largely increased the volume of their business over what it would otherwise have been.

In view of these facts, known to every manufacturer and dealer, and the further fact, that the combined patents represent an unusually large investment of capital, by the present, as well as the former owners—not less in the aggregate than \$100,000—it is confidently expected by the undersigned, that the trade will cheerfully acquiesce in any reasonable tariff of royalties that may be established; and this is assumed with the more confidence, in view of the fact that formal notice of the existence of many of these patents, and the claim made for royalties under them, was served by Perry & Co. upon every member of the trade at the following dates, viz.: March 1, 1873; July 1, 1874; July 20, 1874; Jan. 8, 1875; Jan. 18, 1876; Nov. 15, 1876, and Feb. 15, 1877. Formal and repeated notices have been given at various times, both in catalogues and in the public prints.

Among other warnings thus given in respect to the unauthorized use of these patents, we quote the following: "Nov. 15, 1876. We authorize our customers to give notice to buyers of stoves, that we shall hold all persons liable for infringement of our patents who even use any constructions embracing the so-called 'Anti-Clinker' principle, that are not made either by us or our licensees. We shall at no distant day call upon all unauthorized persons who have infringed these patents, or any of them, by the manufacture, sale or use of stoves, ranges or furnaces, to pay us the profits on same, as well as the damages that we have sustained by reason of such illegal use of our property."

Again: "February 15, 1877. That there may be no misunderstanding or surprise, we again, and for the sixth time, give you notice that the manufacture and sale of stoves, ranges and furnaces embodying the so-called 'Anti-Clinker' devices are a clear infringement of the above-named patents, and that you are now, and have been for some time past, infringing. We ask you to render to us a detailed account of such manufacture and sale, and to take from us a license if you desire to continue the same. Failing in this, we shall ask the court to assess the damages that have accrued to you by virtue of the illegal use of our property, and also the damages that we have suffered by reason of the same."

Notices and warnings to a similar effect have from time to time been issued by Mr. Spear, and by the Anti-Clinker Association, and it would therefore appear that the infringements have been committed defiantly, with a full knowledge of the situation, and are therefore without excuse. The parties to the agreement have expended large sums, while the rest of the trade, with a few exceptions, have paid nothing. We think that simple justice requires that payments should now be made. And as a further reason for this, we will remind the manufacturers of a promise pretty universally made that they would "cheerfully settle when it was decided whether the inventions belonged to Perry & Co. or to the Anti-Clinker Association."

We believe that these inventions are worth, at the lowest, three to six dollars upon each construction in which they are embodied, and in the event of an accounting after a suit, we shall seek to collect for royalties all that we can prove they are worth, besides reasonable amounts for damages.

We have no desire to monopolize these inventions, but are disposed to offer them freely to the trade upon very low terms, and are therefore now prepared to issue licenses to responsible parties at the following rates:

Each.	
On Cooking Stoves and Ranges.....	\$1.00
On Heating Stoves that are sold below \$10.00..	1.25
On Heating Stoves, Fire-place Heaters and Parlor Furnaces that are sold at \$10.00 and above, and below \$20.00.....	1.50
On same that are sold at \$20.00 and above.....	2.00
On Hot Air Furnaces.....	5.00

A discount of 25 per centum on the above rates to be made for cash settlements on rendering accounts, as per stipulations of formal license. And a further discount of 25 per centum to all parties who shall settle for past infringements, and take licenses previous to the first of September next (1879). This latter offer will be withdrawn after that date.

In arranging prices for the future, the necessity must commend itself of adding a liberal sum for royalties to the price of stoves embodying these inventions. No licenses for future manufacture or sale will be issued except to parties who shall have made satisfactory settlement for the past use of the inventions. To all who shall make prompt arrangements for such settlement, as the basis of future licenses, we are prepared to make liberal concessions. The refusal of parties to accept these terms, or their neglect to come forward promptly to effect settlement and take out licenses, will be deemed by us sufficient ground for commencing suits against them. We sincerely hope, however, that the exceedingly liberal spirit in which we are disposed to meet the trade will be fully reciprocated on all sides, so that no occasion for further litigation will arise. After a reasonable delay we shall publish to the trade the names of the manufacturers who are authorized to put in practice these inventions, and to warn dealers and purchasers that they will be held accountable for profits and damages on Stoves, Ranges or Furnaces that they may sell or use which are not thus protected.

For convenience, all communications should be addressed to JOHN S. PERRY, ALBANY, N. Y.

JOHN S. PERRY,
GRANGE SARR, JR.,
Trustees for Perry & Co., James Spear and The Anti-Clinker Association.
ALBANY, June 14, 1879.

Rouse's Improved Wrenches.

R. R. Rouse, of Indianapolis, Ind., is manufacturing some new and improved wrenches, of which we give illustrations on this page. Fig. 1 represents an axle nut wrench. When the sliding jaw C is in its proper position, the set-screw B is screwed up against it. This not only makes the jaw



Fig. 1.

fast, but also tips it, so that when loose the nut is held and prevented from falling. When the wrench is adjusted the loose handle A is held in one hand, while the other handle shown can be turned rapidly. This wrench fits any vehicle, from a coach to a track sulky.

In Fig. 2 is shown a machinist's wrench, for which strength and simplicity are

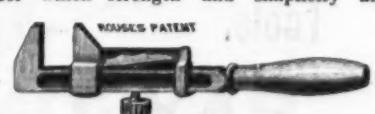


Fig. 2.

claimed. This wrench, with the exception of the handle, is made entirely of steel. When the set-screw is brought in contact with the sliding jaw, which is wedge-shaped, the latter is prevented from opening further, though not from closing. The handle is of hollow iron. It is slipped over the main steel beam and riveted solid.

Smelting Operations at Leadville.—A correspondent, writing from Leadville under date of June 4, says: After the 1st of next month eight more smelting establishments will be completed and in operation, running an aggregate of 12 furnaces, and capable of reducing 400 tons of ore, in addition to the 12 smelted by the older establishments. These will make the aggregate smelting capacity of all the furnaces in the camp for the last six months of the year about \$14,400,000. But there is no evidence that the mines about Leadville will produce any such amount of ore. In fact, the owners of the smelters evidently anticipate a lively competition for the ore that is mined, because they have already reduced the charge for reduction from \$20 to \$25 a ton, which have been the prices during the winter, to \$10 to \$13 a ton, a part only of which decline is to be explained by a decline in the price of fuel. Taking all things into consideration, I think \$8,000,000 will be a liberal estimate for the amount of bullion to be turned out during the last six months of the present year, and \$11,000,000 for the whole year. These estimates are sustained not only by the statistics showing the output of the principal mines of the camp, which can be obtained with considerable accuracy, but also by the opinion of men who are best qualified to judge. Supposing Fryer Hill to produce each month ore worth \$400,000, Carbonate Hill \$300,000, and all other mines \$200,000 (and these are liberal estimates), the output from the 1st of June to the 1st of December would be only \$6,300,000. The president of one of the largest mining companies told me that he did not think the year's product of the camp would exceed

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave patent
"ELECTRIC RAZORS,"
And the celebrated "ELECTRIC SHEARS." Nickel Plated
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Agents for the BENGAL RAZORS.
AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
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The "PATENT IVORY" HANDLE TABLE KNIFE.

It is oldest manufacturers of Table Cutlery in America. Exclusive makers of the CELLULOID HANDLE
for Table Cutlery, a most beautiful and perfect substitute for Ivory. Also makers of all kinds of TABLE,
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CHAMBERS ST.
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AMERICAN TABLE
CUTLERY &c.



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My Blades are forged by hand from the best Cast Steel, and warrant-
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(Patented.)

Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.

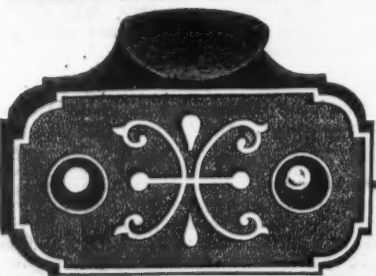
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MANUFACTURERS OF
Improved
Carpenters'
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No. 113, Improved Adjustable Circular Plane \$4.00

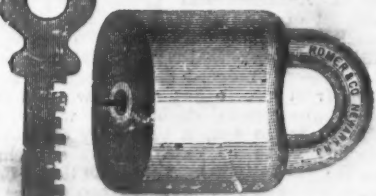
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Manufacturers of Patent Scandinavian or Jail
Locks, Brass Pad Locks for Railroads and Switches.
Also Patent Stationary R. R. Car Door Locks. Pat-
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Shovels, Spades and Scoops. These Trowels and Hoes
have entirely supplanted the English by their quality
and cheapness, while all their goods compare advan-
tageously with those of other makers and are largely
exported.

MACHINE MOULDED
MILL GEARING,
AS ACCURATE AS CUT GEARING,
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Saves Time and Expensive Patterns.
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LEFFEL TURBINE WATER WHEELS,
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HAVE YOUR HAIR CUT.



Clark's Hair Clipper.

Extensively used and the only reliable machine
for close clipping.
Simple in operation and finishes the work in
short time.

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MANUFACTURERS OF
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STEEL,
Table Knives, Razors, Shovels, &c., &c.,
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GENERAL HARDWARE MERCHANTS,

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BALL'S PAT. SOLID STEEL SHEEP SHEARS.

These shears are unsurpassed for cheapness, dura-
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of steel from point to point, and cannot be broken in
use either in the bow or at the junction of the shank
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No. 52 Chambers Street, New York.

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The demand for Joseph Rodgers & Sons'

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have, in order to meet it, greatly extended their

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To distinguish Articles of Joseph Rodgers

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Young's Patent Folding Scissors.

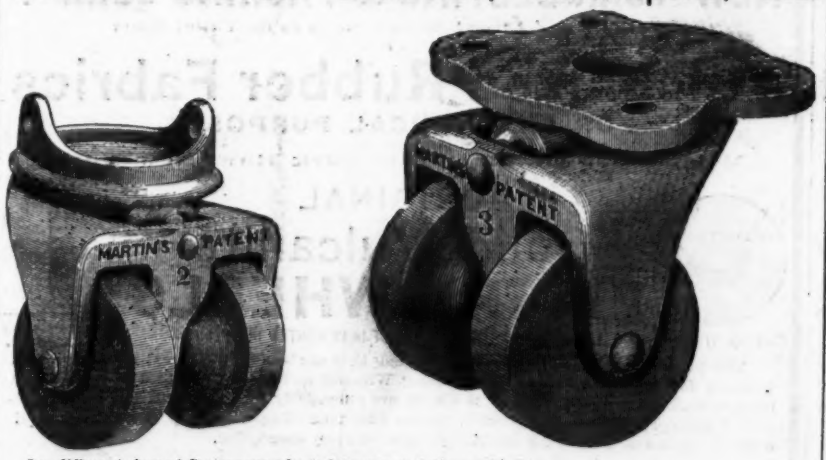


Having largely increased our facilities for the manu-
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per dozen, formerly \$18.00, and the small size, \$8.00,
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very best. All are nickel-plated and furnished with
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No. 1. For parlor chairs and other very light furniture.
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No. 5. For pianos extra heavy sideboards and bookcases.
No. 6. For show cases, light store trucks, ice chests, heavy refrigerators, heavy flower stands, &c. Es-
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Light 1
Durable, short hitch,
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Frederick's 3-Horse Equalizer is a perfect Double Tree, a perfect Triple Tree, a perfect 3-Horse
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Manufacturers of

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Screw

Wrenches.

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December 26, 1871.

December 28, 1875

August 1, 1876.

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Wanted.These Balances are as easily
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They do everything claimed for
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\$6,000,000; the manager of the largest
smelter thought that it might possibly reach
\$12,000,000; and this was the largest esti-
mate I have been able to obtain from any
one who is in position to express a very in-
telligent opinion.

Car Axles, Nuts and Screw Threads.

At the recent meeting of the Master Car
Builders' Association in Chicago, we find
the following matters of interest to our
readers. In the course of his opening ad-
dress, President Leander Garay said:

Gentlemen of the Convention.—The officers
of several roads during the past year have
permitted the ordinary 10-ton car to be
loaded with 12 tons. Some of the results of
this increase of load per car is hot journals,
bent and broken axles, with their conse-
quent expense of repairs. The matter of
uniformity in car axles and journal bear-
ings has occupied the attention of master
car builders more, perhaps, during the past
year than ever before, and the action of the
Master Mechanics' Association in recom-
mending the use of the standard axle pro-
posed by this association six years ago, will,
it is thought, do much to push forward its
more general introduction, if in reconsider-
ing the matter this year you should reaffirm
the conclusions you adopted in 1873. It is
of the utmost importance that the subject
should be fully discussed, and that all should
have abundant opportunity of expressing
their views. I would suggest that you in-
struct the committee which now has this
subject under consideration, to confer with
the similar committee of the Master Me-
chanics' Association, to prepare a standard
drawing and engraving of the axle, and a
journal bearing to correspond, and that
such engraving be published in the next
annual report. At present there is some
doubt about the minor dimensions of the
axle, and some of these are in dispute. It
is important, therefore, that some estab-
lished standard should be fixed from which
there can be no appeal, so that railroad
companies and officers disposed to adopt the
standard axle need not be in any doubt con-
cerning its dimensions. Without intending
to anticipate your action in this matter, I
would also venture to suggest that you in-
struct either the present committee on
axles, or a special committee to be appointed
for the purpose, to prepare a communication
to be addressed to the superintendents and
managers of railroads, setting forth the
reasons for the adoption of your standard
in all new cars to be built or reconstructed
hereafter.

I would call attention to the advantage of
small, light cars, to be used in local freight
traffic. Freight to be moved short dis-
tances are usually presented in small lots,
which must be moved at once, and the or-
dinary 10-ton car is usually sent out with
an average load of 3 tons to the car, which
could be handled in smaller cars with much
economy. I would recommend that foreign
cars found with leaky roofs be reported to
their owners, and also to the general freight
agents of the lines in which they are em-
ployed.

Your committee on screw threads will
doubtless report to you such action as to
them seems desirable to take in the matter.

With reference to screw threads, it may
be said that one very great evil at present
is the use of odd sizes of screws, that is, of
sizes 1-64 or 1-32 larger than the fractions
of an inch ordinarily in use. A standard
system of screw threads is impossible so
long as this system prevails. The reason
assigned for it is that merchant bar iron
usually overruns its nominal diameter, and
therefore either the dies for making screws
must be larger or the extra thickness of the
iron must be cut off.

That the manufacturers of iron will con-
tinue to make it over size just so long as
master car builders will be satisfied with it
seems probable, but a very little inspection
of iron when received would soon remedy
this evil. A suitable resolution recommend-
ing that none but "even" sizes be used for
screw threads would probably be of service
in remedying the evil and establishing a
more uniform practice.

The report of the committee to investi-
gate and report on the present construction
of screws and nuts used on cars, on the
amount of accuracy that it is desirable to
secure, and the best means of maintaining
it in the standard adopted by the Associa-
tion in Richmond Va., June 15, 1871, was
read, as follows:

Your committee appointed at the last con-
vention "To investigate and report on the
present construction of screws and nuts
used on cars, and the amount of accuracy
that is desirable to secure, and the best
means of maintaining it in the standard
adopted by the association in Richmond Va.,
June 15th, 1871," respectfully submit the
following report for your consideration:

Among the appliances required in the
construction of a good and substantially-
made car, there are none of greater im-
portance than that of properly proportioned
bolts and nuts.

And when it is considered that these are
profusely used over all parts of the car, it
certainly appears unnecessary to remark
that they of all parts should bear the stamp
of uniformity. That is to say, every bolt
professedly of the same diameter of screw
should be interchangeable, so far as the
fitting of nuts of professedly the same size is
concerned.

This desideratum can be obtained easily if
bolts and nuts are screwed to one gauge, no
matter what form of thread may be adopted,
so long as the size and pitch of thread be
uniform.

In dealing with the construction of one
car, or any number of cars built by or for
any one or more companies, so long as the
bolts and nuts fitted each other accurately,
and the threads were of a shape that would
hold well, there might be no reason to ques-
tion their suitability, and hence there would
be no necessity for reporting on the subject.

But when experience steps in and calls
attention to the fact that there are numer-
ous parties manufacturing cars by the hun-
dreds and thousands, and that these cars are
traversing the whole continent, becoming in
a certain sense indiscriminate property, and

that in the one essential particular of bolts
and nuts there is no attempt made for
securing uniformity, then it would appear
necessary that something should be done to-
ward bringing about that most desirable
result.

In the year 1870 this association felt the
necessity of taking measures for the acquir-
ing of a standard thread, and in the year
following, a report embodying a standard
pitch of thread, and also a standard for
width and thickness for bolt heads and
nuts, was submitted and emphatically adopted
by this association.

This standard was the one previously
adopted by the Franklin Institute in De-
cember, 1864, and recommended by that
body for general adoption as the American
standard.

The following is a copy of the resolution
adopted by the Franklin Institute:

Resolved, That the Franklin Institute of
the State of Pennsylvania recommend for
general adoption by American engineers the
following forms and proportions for screw
threads, bolt heads and nuts, viz:

That screw threads shall be formed with
straight sides at an angle to each other of 60°,
having a flat surface at the top and bottom
equal to one-eighth of the pitch.

The pitch shall be as follows, viz:

Diameter.....	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"
No. threads per in.	20	18	16	14	12	10
Diameter.....	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"
No. threads per in.	12	10	9	8	7	6

Note.—This table extends further, to bolts 6
inches in diameter, which is unnecessary for car
builders.

The distance between the parallel sides of
a bolt head and nut shall be equal to one and
a half diameter of the bolt, plus one-eighth
of an inch.

The thickness of the heads for rough bolts
shall be equal to one-half the distance be-
tween their parallel sides.

The thickness of the nut shall be equal to
the diameter of the bolt.

The thickness of the head for a finished
bolt shall be equal to the thickness of the
nut.

The distance between the parallel sides of
a bolt head and the thickness of the nut shall
be one-sixteenth of an inch less for finished
work than for rough.

The following is a table showing the di-
ameter of bolts, number of threads per inch,
width of rough bolt heads and nuts between
parallel sides, and sizes of holes in nuts to
correspond with bolts:

Diameter of bolt.	No. threads per inch.	Width of heads and nuts.	Holes.
1/4"	20	5/8"	13-64
5/16"	18	11-16	15-64
3/8"	16	1 1/16	17-64
7/16"	14	1 3/16	19-64
1/2"	12	1 1/2	21-64
5/8"	10	1 7/8	23-64
3/4"	9	2	25-64
7/8"	8	2 1/8	27-64
1"	7	2 1/4	29-64
1 1/8"	6	2 5/8	31-64
1 1/4"	5	3	33-64

Now, considering the great intercourse
and interchange of traffic that has taken
place of late years, and the natural inter-
change of cars belonging to the numerous
companies from the extreme parts of Amer-
ica, and the economical advantages to be de-
rived from the assimilation of the chief de-
tails of cars most liable to be injured or dis-
arranged, and above all may be mentioned
the bolts and nuts, it seems almost incon-
ceivable that the master car builders them-
selves, who have to effect the repairs and
renewals needed, should not have secured a
greater uniformity of construction gener-
ally, and especially in reference to the sim-
ple matter of bolts and nuts.

Although the Franklin Institute, or Amer-
ican, standard was accepted and published
in 1871 by the master car builders as their
adopted standard, yet we find that in the
present year (1879) they are actually work-
ing without a standard.

One has a sharp V thread; another has a
thread with a rounded top and bottom;
another a flat top and bottom thread; and
still another with an indefinite thread,
amounting to almost no thread at all, for it
neither has depth nor pitch, nor resisting
surface fit for railroad or any other service.

Taking them with their defects, as we too
often find them, some 1/32" smaller than the
true gauge, while others are 1/32" larger,
they present a conglomeration, to say the
least, as very remarkable and very unde-
sirable.

Many, if not all of us, have experienced
troubles caused by these bolts and nuts with
no threads and loose fits, in the dropping
down of brake beams, draw bars, truck
framing, and many other parts, which are
here too well understood to require their
particularizing.

It devolves upon your committee to speak
very plainly on this subject, and point out
the remedy.

This is found by simply carrying out in its
entirety the standard which you have al-
ready approved and accepted, viz: the
Sellers threads and the Franklin Institute
sizes of bolt heads and nuts.

Unlike the thousand and one car couplers
patented, there is no royalty to pay for this
Franklin standard.

Besides the question of pitch and form of
threads, there is that of gauge size.

As already stated, we find the screws of
bolts and nuts varying in diameter, in some
cases to the extent of 1-16th of an inch, and
yet they are called by the same designation,
viz: 1/4", 5/16" or 3/8", as the case may be.

The fact is this—many makers of screw-
ing tools evidently use rule-of-thumb gauges,
and if they can approximate somewhere
about the true size, they think it is "near
enough."

These "near-enough" makers do not ap-
preciate mathematical accuracy, and it is
open to doubt whether they ever saw those
splendid specimens of art called gauges as
made by Whitworth, or Sellers, or Pratt &
Whitney, for, when once seen, a conscience
must be very much blunted to be satisfied
with work done by "thumb rule." Guess-
work is nearly its equivalent.

To secure this standard system of taps
and dies it is not necessary, for the require-
ments of car builders, to expend a large sum
of money.

The five sizes, say, from 1/4 inch to 1 inch, in-
clusive, will cover all that is usually
needed, and, if purchased from a first-class
manufacturer, who makes a specialty of
taps and dies, the cost will probably be

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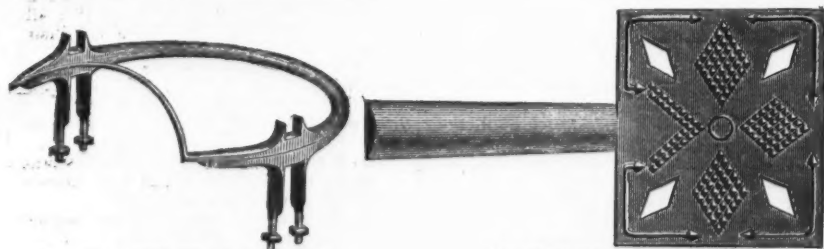
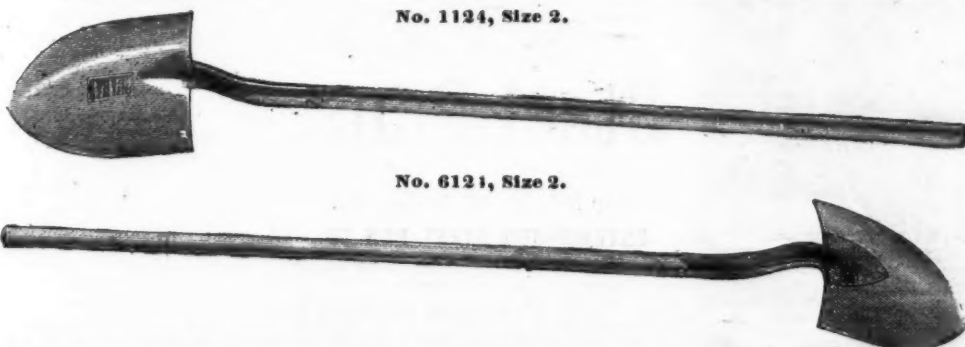
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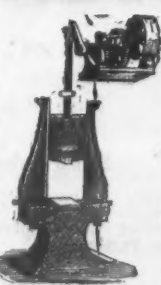
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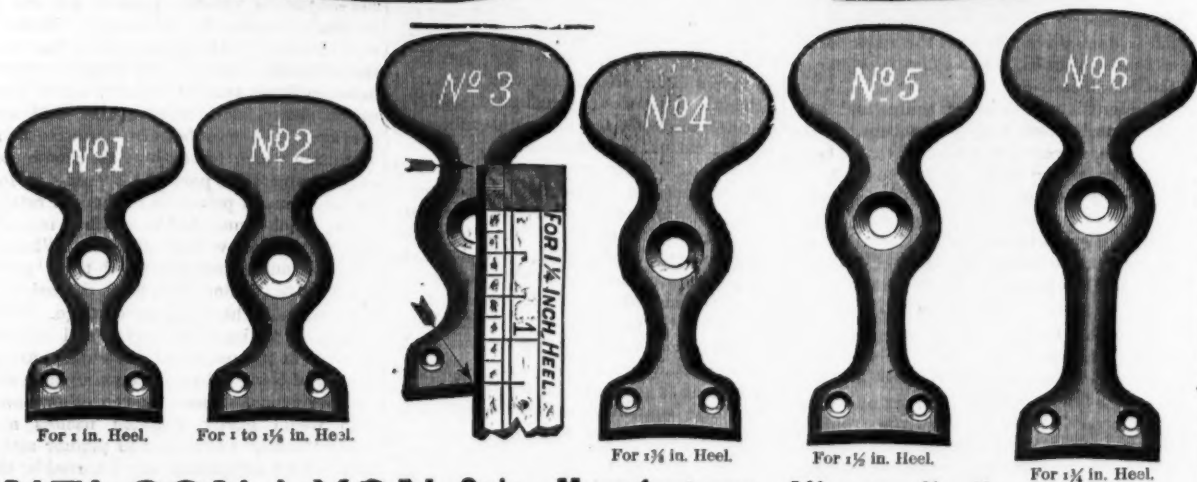
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COTTON AND RAIL HOOKS.
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found less than if we made them ourselves, and then we may depend upon securing an accuracy scarcely otherwise attainable.

In ordering taps and dies, it will be only necessary to specify the sizes required, and name the standard as that adopted by the Franklin Institute.

This report would scarcely be complete without referring to the sizes of bar iron obtained for making bolts, and the sizes of nuts received from manufacturers.

If the members of this association will take the trouble to measure the diameters of bars ordered, they will probably find a variation in size equal to 1-32d, and perhaps in some cases 1-16th, of an inch larger than the size ordered.

To show the results of such inaccuracy, it is only necessary to point out the extra weight to be paid for over and above what a correct-sized bar or nut would cost, from which those companies ordering large quantities can readily ascertain what they pay for useless weight in the course of a year.

Taking bolt iron first, and assuming the size required to be 3/4 inch diameter, if it is 1-32d larger, the extra weight will be about 10 1/4 per cent. more; and for 1-16th larger, the extra weight will be nearly 21 per cent. more.

For 3/4 iron, an increase of 1-32d of an inch adds 8 1/2 per cent., and for 1-16th of an inch larger it adds nearly 17 1/2 per cent.

In like manner runs the extra weight for other sizes of iron, all of which has to be paid for in proportion to the weight, while for the purposes required the standard sizes are all that are needed.

Again, in the case of nuts and taking the Franklin standard sizes as a basis for computation, we find from a manufacturer's lists before us, that there should be 738 square nuts for 3/4 bolts in 100 pounds, while the actual number of those in very general use is only 440. For 3/4 nuts of the Franklin standard there should be 420, instead of which we get only 260 of those in common use for 100 pounds. From these comparisons we see the loss in number of 3/4 nuts is 41 per cent. and of 3/4 nuts 38 per cent., and this loss can be prevented by simply conforming to the Franklin Institute standard.

It is unnecessary to extend this report further after so fully demonstrating the many advantages, and the economy which would result, by carrying out in its integrity the standard threads in combination with standard sizes for bolts and nuts.

Every member is more or less interested in the subject, and in these days when the interchanging of cars is the rule, and members are expected to treat foreign cars as their own, it needs must be admitted that the sooner a general uniformity is adopted and maintained in practice, the better for all concerned. Respectfully submitted.

June 9, 1879. JOHN ORTTON, C. S. R.

Discussion.—Mr. Davenport stated that while it had been intended by the association to adopt the United States standard, that fact had not been very clearly understood. The fact should be impressed that the Master Car Builders' standard is the "United States standard." Some have the mistaken impression that the V thread is intended in the Master Car Builders' standard, which is not the case.

Mr. Orton had been so impressed with the necessity of uniformity in screws and nuts that he had entered into the subject with considerable zeal. He, in common with others, had much difficulty from the difference between nuts and screws. They do not fit accurately, and the nuts soon work loose. He enumerated several accidents which had resulted from this fact. There is nothing about a car in which there is greater necessity for uniformity. Some large companies are still using V threads instead of those with flat top and bottom. The Franklin Institute had decided upon certain sizes of nuts, and if these standards were conformed to, a large saving of money would be effected. Out of every 100 pounds of nuts purchased they might get 45 per cent. more nuts for the money. They should buy by the number of nuts instead of weight. The same thing is true of bolts. It should be specified, in ordinary bolts, that the standard must be exactly conformed to, and this should be rigidly adhered to. He exhibited several samples of nuts, showing the differences in sizes and discrepancies between the threads. It was worse than folly to try to secure brake beams by such badly fitting nuts and bolts. Well-fitted threads will do more to secure immunity from accidents than any other thing, which is so easy and inexpensive.

Mr. Davenport said that the maintenance of the standard required close care and attention. It would pay and ought to be done.

Mr. Leander Garey admitted that Mr. Orton had exploded a bomb-shell in the midst of the association. He confessed that he had not been as careful in this matter as he should be. The M. C. B.'s could do nothing which would aid their companies in the matter of dividends more than to use and insist upon these standards.

Mr. Kirby considered that the Master Car Builders did not have the requisite authority to enforce this matter. When they purchase cars, they cannot change all the bolts, screws and nuts. The matter should be carried to the higher authorities.

Mr. Garey: The car builders should figure the matter up and present the result to their superior officers. They would soon take action.

Mr. Orton: Car manufacturers will conform to the wishes of this association if the matter is sufficiently impressed upon them. They certainly would wish to save the extra and useless material in nuts. For six or eight years we have allowed our rules to lie dormant; it is time to enforce the rules adopted in 1871. He was glad to see the committee report so warmly seconded by Mr. Davenport and Mr. Garey.

Mr. Booth coincided with the opinion expressed on this subject. His road used the U. S. standard, and had much trouble from the lack of uniformity among other roads. He thought if this association took emphatic action in the matter, it would have a wonderful effect.

Mr. Adams thought every one was con-

vinced of the difficulty occurring every day in repairing foreign cars. When a nut was gone, it was frequently necessary to throw the bolt into the scrap pile. It is easy to get away from uniform sizes. A very little wear upon the tap and die will vary the thread; and very soon they get far away from the standard. We make screws and nuts at our different shops. We started on the standards with taps and dies exactly alike. But they kept getting apart, and I think it almost impossible to keep the taps and dies uniform. We must have a standard gauge; must go to some party making gauges, and all get the same gauges. To do this we must have the approval of our superior officers. To secure uniformity on our road we have hardened steel nuts exactly uniform, and these are kept with each bolt machine, and the bolts are constantly tested with them. We make all our nuts at one shop.

Mr. Orton thought that too much disposition was manifested to throw the reform on the shoulders of superior officers. There is not one of us but has control of this matter of screws and nuts. He thought it best to buy taps and dies from manufacturers; it was cheaper and insured greater accuracy. He then offered the following resolution:

Resolved, That this association will in future adopt the Sellers' threads and sizes of nuts, as recommended by the Franklin Institute, and that in giving any future orders for bolt iron or nuts, they will require the sizes to conform strictly to the above standard. They also emphatically submit this resolution to the earnest attention of all car manufacturers, and urge them to adopt the same standard sizes in all cases within their control.

Mr. Forney gave a brief history of the Franklin Institute standard. It was devised by Mr. William Sellers, and should bear his name. The United States navy and army had adopted it, and the Railway Master Mechanics' Association had also done so. Mistakes had been made by some in adopting merely the number of threads to the inch, but neglecting the matter of form. He explained the difference between the Sellers' and Whitworth forms. The former is flat on the top and bottom of the thread, and the latter rounding. The former is more easily manufactured and maintained with accuracy.

Mr. Orton's resolution was passed. Mr. L. Garey moved that a committee of two be appointed to prepare an address upon this subject, embodying the entire argument.

Improved Drum Hose Carriage.

We show in the accompanying illustration a drum hose carriage, manufactured by Manard & Bro., Rockford, Ill. It is designed for handling yard hose, in connection with yard hydrants. It is provided with a drum on wheels to wind the hose, to obviate the danger of cracking in drying and to allow the water to pass uninterrupted.



edly through it when wound up or be expelled upon reversing the reel. It is also provided with a device to retain the reel as fast as the hose is wound upon it, has adjustable rubber clamps to grasp the nozzle of the hose, and other improvements.

Trade With the Mexican Ports.—The Mexican government has recently issued a decree that is of unusual interest to American merchants doing business with the seaport towns of that republic. Heretofore expensive and vexatious delays have been caused to steamers in the Mexican trade. These steamers were obliged to lay over at the first ports in Mexico they touched until their invoices of goods for that and other ports were overhauled, examined and copied. Not unfrequently this delay has lasted for several days before the steamer could proceed to other Mexican ports for which she might have freight and passengers. The new decree to which we have referred does away with this superfluous delay, and enables steamers to proceed on their way without inconvenience or annoyance. The decree provides that captains or commanders of vessels which make regular trips, and which carry merchandise to two or more seaports in Mexico, instead of depositing the invoices covering all their freight in the first of these ports reached, and waiting in port until acted on, shall deliver merely to the custom-house official a copy of the general invoice of that part of the cargo destined for other ports. A second section specifies, however, that this does not sanction the neglect of complying with the usual custom-house regulations. Besides facilitating trade, this action on the part of the Mexican government shows a disposition to promote closer commercial relations between the two countries.

It is estimated by English journals that the loss in wages occasioned by the late strike of colliers at Durham amounts to \$3,000,000, \$1,000,000 of which was borne by the men. Each miner has, it is said, lost \$25.60 in wages in a strike in gaining 1 1/2 per cent. better terms than the owners offered at first, 1 1/4 per cent. being 0.8 cent. in the dollar. The colliers will have to work 9 1/4 years to recover the \$25.60, without reckoning interest.

The Iron Age

AND
Metallurgical Review.

New York, Thursday, June 26, 1879.

DAVID WILLIAMS, Publisher and Proprietor.
JAMES C. FAYLES, Editor.
JOHN S. KING, Business Manager.

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Semi-Monthly Edition: \$2.50—£1=12½ francs=10 marks=6 florins=3 roubles (coin)=12½ lire=10 pesos.
Monthly Edition: \$1.25—£1=6¼ francs=5 marks=3 florins=1½ roubles (coin)=6¼ lire=5 pesos.

REMITTANCES should be made by draft, payable to the order of David Williams, on any banking house in the United States or Europe; or, when a draft cannot be obtained, in postage stamps of any country.

NEWSDEALERS OR BOOKSELLERS

In any part of the world may obtain *The Iron Age* through the American News Company, New York, U. S. A.; the Wilmer & Rogers News Company, New York, U. S. A.; and London, England; or the San Francisco News Co., San Francisco, California, U. S. A.

RATES OF ADVERTISING.

One square (12 lines, one inch), one insertion, \$2.00; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$40.00; payable in advance.

DAVID WILLIAMS, Publisher,
33 Reade Street, New York.

PITTSBURGH.....77 Fourth Avenue
JOS. D. WELLES, Manager and Associate Editor.

PHILADELPHIA.....220 South Fourth Street
THOS. HOBBS, Manager.

CINCINNATI.....Merchants' Exchange
T. T. MOORE, Manager.

CHATTANOOGA.....Eighth and Market Streets
S. B. LOWE, Manager.

BRITISH AGENCY.
The publishers of *The Iron Age*, 44 Cannon Street, London, England, will receive orders for subscriptions and advertisements on our regular terms.

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In another column we print a circular of much interest to all branches of the stove trade. It is issued by Messrs. John S. Perry and Grange Sard, Jr., trustees of the alliance lately effected between Perry & Co., James Spear and the Anti-Clinker Association, by which all the patents that the parties in interest consider of value as relating to the principle of the anti-clinker grate, are combined. This, as we have before said, ends the litigation between Perry & Co. and the Anti-Clinker Association, and under the conditions of the alliance, Messrs. Perry and Sard, as trustees, are to collect and divide between the parties in interest the royalties which both Perry and Spear have hitherto claimed as due for past infringements of their patents, and issue licenses for the use of anti-clinker grates in future. The circular is explicit and business-like, and will explain itself. It brings the stove trade face to face with the question in a shape which the trade at large have never ex-

pected it would assume. Most of the manufacturers who have used the anti-clinker grate in cook stoves and heaters have imitated the example of the third dog in the fable, who picked up the bone and ran away with it while the two dogs who originally claimed to have found the bone were quarreling for its possession. But now that the two dogs have settled their differences and have joined in the chase, with a full pack at their heels, the dog who until lately congratulated himself that he had got safely away with the bone, will have to consider whether he will give it up or fight for it. At present we are unable to say which course he is likely to adopt.

Position and Prospects of Tin.

Since our annual review the world's tin markets have been continually fluctuating, but these fluctuations have not been as extreme as they used to be when the altered position of the metal was not yet fully understood. The time to which we refer was about two years ago, when Straits tin was still bordering upon £90. The reason why tin fluctuates less violently nowadays, has to be looked for in the fact that consumption, under the stimulus of lower prices, has considerably increased in the United States. China was not much of a consuming country in former years, but from the moment Straits tin declined at Singapore to about \$10 per picul, China began to take increased quantities; and, as the manufacture of metal goods is immense in that country, there is no saying what quantities it may eventually absorb. We believe our estimate is not exaggerated when we value Chinese consumption at as high a figure as ours, say 6000 tons per annum on an average. We say on an average, because at a certain price Chinese consumption has hitherto been stopped abruptly, showing that cheapness is a *conditio sine qua non*.

The doubling of consumption in the United States within the past few years, and the unexpected growth of the Chinese demand, together increased the consumption of tin at least 7000 tons annually, while the price was low—i. e., while the price was nearer £50 than £80 for Straits tin. So long as prices remain about midway between these two extremes, as they are at present, we do not see why consumption should not go on undisturbed, and gradually even increase with the revival of trade and the increase of population. It may even swell considerably should the price again approach £50.

So far as accounts have reached us since our annual review, production shows no particular increase anywhere; it is simply steady, while larger in Van Diemen's Land than was expected. The inducements to push this large Tasmanian production are also greater than were supposed, for the position of the tin fields, and other favoring circumstances, enable the smelter to produce a good quality of tin at about £30. On the Australian continent it costs some £50; but the entire Australasian production is as yet not large enough to check the output anywhere in the East, and the consequence has been that the lowest price to which Straits tin was depressed, in a panic in London during the fall of last year, was £53, from which it rallied, through a well-concerted speculation, to £70, and has since receded to £66.

In Europe consumption does not expand as rapidly as it does in the United States and China, but it nevertheless makes steady headway, and the general outlook seems to us reassuring—that is to say, we have arrived at a stage which seems to place tin upon its intrinsic value, £65.

Much will, of course, depend upon the general business aspect on both sides of the Atlantic during the latter part of the current year. Prospects in Europe are by no means brilliant, nor are they discouraging. The economic questions now agitating the business community will all be settled by the end of the year; the crops are poor if anything, but not positively bad, and wars are not apprehended, while money will in all likelihood remain cheap. In this country the business outlook is a great deal better than it is in Europe. The crops are ample, prices moderately remunerative even for cotton, and the cost of living has cheapened to an extent not witnessed since 1861.

Stocks of tin and other metals not being large in the hands of dealers and consumers anywhere, it is fair to presume that prices will not show the weakness they exhibited last year toward autumn, unless production again runs into extremes in some quarter where such an increase is not apprehended. Moreover, the statistics present nothing very alarming so far as tin in Europe is concerned:

STOCK MAY 1.			
	1879.	1878.	1877.
	Tons.	Tons.	Tons.
London.....	10,524	9,308	9,139
Holland, East Indian.....	3,922	2,997	2,038
" Australian.....	236	426	700
Total.....	14,682	12,731	11,897

From the Straits..... 575 745 320
" Australia..... 1,550 2,190 2,300
" Dutch East Indies..... 1,150 1,300 1,030
Total..... 3,281 4,235 3,710
The visible supply June 1, 1879, was, therefore, 17,963 tons, against 16,966 and 15,607 in 1878 and 1877. To this there has to be added Banca aloft for the Netherlands Trading Company, 630 tons, against 412 and 63, making a total of 18,593 tons, against 17,378 in 1878 and 15,670 in 1877. This constitutes an excess of 1215 tons over May

1, 1878, which is not much so far as Europe is concerned.

The matter stands a little differently as regards stocks in first hands in New York and neighboring ports. We find stocks in importers' hands and afloat unusually large, and requiring brisk times in the fall to prevent a glut should importation not be materially checked. The probabilities are, therefore, that during the summer season this market will be dull and prices low.

The Protectionist Movement in France.

In our last issue we referred to M. Leon Chotteau and the hopeless mission he has undertaken in endeavoring to convert the people of the United States to the acceptance of his gospel of reciprocity. While it is evident to all who have watched the course of public sentiment in this country, during the last ten years especially, that M. Chotteau will have his "labor for his pains," his course is not so devoid of wisdom as would at first appear to be the case. M. Chotteau's mission is but a part, and a somewhat small part, of a scheme involving an entire and radical change in the treaties affecting the commercial relations of France with other nations. He is supported and endorsed by those who are at the bottom of the present agitation in France relative to protection, and the movement for reciprocity with this country is but a part of the plan of the French protectionists. Our readers will remember that all of these treaties have been "denounced;" that is, notice has been given by France of a desire to terminate them at their expiration. This action has an important bearing not only upon French industry, but also upon the future of the French nation, and one that is not sufficiently understood abroad. Up to 1860, the time of the negotiation of the famous commercial treaty with England by Napoleon III, France was at least moderately protectionist, if she could not be rated as strongly committed to this policy. Led by his great desire to conciliate the English nation, the Emperor concluded this treaty, by the terms of which the two nations virtually established mutual free trade, the exceptions being mainly in the case of silks, wines, chocolates, plate, &c. This treaty was the beginning of the downfall of the Empire. While it gave a new impulse to some branches of French industry, notably to agriculture, it aroused an intense opposition among the great manufacturers, and for the first time a strong class arrayed itself against the Imperial policy. In the period between 1860 and Sedan, one cannot fail to trace the disaffection of the industrial classes running like a dark thread through the whole fabric of French politics, until at last it destroyed the design entirely.

Under the new order of things and with the consolidation and permanency of the Republic, it was to be expected that a large majority of the ruling party would be in favor of some change in the existing treaties in the direction of a return to the traditions of the days before 1860. They had denounced the commercial policy of the Empire, and the policy of the Republic would naturally be the opposite. It was in answer to this sentiment that the treaties were denounced last year.

This sentiment is much stronger in France than is believed. Within a short time there have been held in Paris two meetings of delegates from the chambers of commerce, which are established at all important trade centers. To the convention of those representing free trade, eighteen chambers sent delegates. To the one representing protection, fifty-eight chambers sent delegates. It is claimed by the English journals that the most important chambers were represented at the free-trade convention. While this may be partially true, fifty-eight to eighteen is too large a proportion to be disregarded. The burden of the speeches at the protectionist convention, and the addresses of the delegates to the Minister of Commerce, might be mistaken for the utterances of a delegation of the American Iron and Steel Association, if certain names and figures were changed. The decline in merchant shipping, and the increase of the carrying trade in foreign bottoms—especially English—were set forth, and the urgent necessity of a tariff to the existence and adequate support of the large industrial population of France, was pressed upon the attention of the Minister. Early last year, the Committee of Inquiry into the Causes of the Commercial Depression in France made its report. In this inquiry, the report of which has been widely circulated in France, many of the representatives of the various branches of French industry who were examined were very decided in their views regarding the necessity of protection.

It is these facts that give M. Chotteau's views all the importance they possess. It is evident that the French industrial classes will demand—and probably succeed in obtaining—protection against their neighbors. As a result they will foster and encourage certain branches of their industries that have been impaired by foreign competition under the virtual free-trade treaties. On the other hand, the competition from America in these branches is very slight, while the injury our tariff has inflicted on their wine and silk trade with this country is very great. Now, if reciprocity could be brought about between France and the United States, but little injury would be done to those branches which

need protection, while those that do not need it at home will have the barrier against their extension in this country removed. This is the feeling in France. It may be a mistaken view of the results of reciprocity, as the removing of the prohibition upon the importation of iron, &c., may lead to shipments of certain classes of goods from this country. Be that as it may, there is a strong feeling of the kind we have mentioned in France. M. Chotteau, to some extent, represents this phase of French public opinion, and this fact explains the nature of his mission.

Loss of Life in Mining Coal.

The frequent recurrence of explosions in coal mines, with their scenes of terror and anguish which plunge entire communities into grief, rouse the sympathy and provoke the indignation of the civilized world. They have caused coal mining to be associated in the popular mind with a constant battle with a terrible, and apparently invincible danger. The press and the people have urged and insisted upon legislative interference, based upon elaborate and careful investigations made by eminent scientists and experienced engineers, and it is but justice to say that they have been supported and aided by the colliery proprietors, who have large interests at stake, and to whom an explosion may mean utter ruin financially. While we are far from finding fault with the motives of these efforts, and fully appreciate their results, which we hope will ultimately lead to the entire suppression of accidents, we desire to attract attention to another class of disasters which escape record in the press. Judging from what is occasionally presented to the public in the shape of contributions to the literature of coal mine explosions, there is much room for intelligent discussion even on a subject which has been so thoroughly canvassed. False impressions are created by one-sided views, fondly cherished by would-be reformers to the exclusion of all other considerations. Thus we find a recent English writer who has experienced the "terrible oppression of utter darkness, and the irritation produced by inadequate light," starting off from the proposition: "The miner requires 'light.'" Mr. F. R. Conder, the writer of the essay in question, forgets or neglects all the various important points connected with ventilation, fire testing, the enactment and enforcement of proper police measures, the removal of coal dust, the regulation or suppression of blasting, &c. He looks to "satisfying the mute instinctive demand of the 'miner for light,' for the prevention of explosions in coal mines. The importance of good light has never been denied, and the efforts to secure it have been numerous, and, in some cases, successful. But it is quite in a different direction that increased light will aid in doing much good, and it is to this, a subject too generally unheeded, that we wish to call attention.

In almost every country in which coal mining assumes industrial importance, records of the casualties in coal mines are now, and in some cases have been for many years, officially kept. We need only refer to them to show that Mr. Conder is not alone misunderstood the measures necessary for the prevention of disasters, but also the value of better light in preventing the loss of life. In England, taking an average of 15 years, 20 per cent of the fatal casualties were attributable to explosions, 33 per cent to falls of coal and of roof, 15 per cent to shaft accidents, and the rest to miscellaneous causes. According to the Inspectors' Report for Great Britain for 1878, just published, the number of deaths (a) and of separate accidents (b) for 1877 and 1878 were:

	(a) 1877.	(b) 1877.	(a) 1878.	(b) 1878.
Explosions.....	341	42	386	31
Falls of coal, &c.....	422	403	459	439
In shafts.....	124	112	104	88
Miscellaneous in mine and on surface.....	265	249	233	217
Total.....	1152	806	1182	869

It may be interesting to add that the reports of the inspectors of the first, second and third bituminous districts of Pennsylvania for 1877-78 show the following record of fatal accidents:

	1st.	2d.	3d.
Explosions.....	7	3	1
Falls of coal or slate.....	26	3	9
Miscellaneous.....	—	—	1
Total.....	33	6	11

From these figures it will readily be understood why the classes of accidents which are most fatal in the aggregate, easily escape the attention of all but the few whose daily observance of the miner's life has made them acquainted with the facts. As a comparison of the number of accidents will show, there are generally, in falls of slate or roof, only one, and rarely more than three or four victims, whose death is mourned by a few and is rapidly forgotten by the community. On the other hand, it must be taken into consideration that explosions generally prove fatal to many, and a few only escape alive, while by far the greater number of accidents from the fall of coal, roof or sides results in slight or serious injury, and exceptionally only in death. The greatest source of danger to the miner is the insecurity of the workings, and therefore it is to their better support that those who would rob the miner's life of its perils must turn. In this matter they have not the support of public opinion, since the public know nothing about it. Nor is it as evidently the interest of the colliery owner to aid in the prevention of accidents of this kind as it is to avert fire-damp explosions, which imperil his

property. On the other hand, we regret to say, miners often display a degree of recklessness which is nothing short of criminal. Add to this the ignorance of danger which results from inexperience, and the proportions to which the annual death roll swells will not appear surprising. The remedy lies in a thorough system of substantial timbering, put up, if possible, by a gang of men who have no other duties, and subject to frequent inspection by proper officers. As an example of the comparative immunity from danger which the dexterity of men well trained brings about, we may name the gangs of men who, in many mines, rob the timbers from exhausted workings, or throw down the coal of thick seams by snatching away the timbers which support them.

There is no part of the miner's duties which so emphatically calls for the exercise of judgment, to be acquired only by years of patient observation of facts and by practical experience, as the timbering of the workings. Much can be done to secure safety by appropriate modifications of the method of mining, by good light, &c., and to this engineers and colliery miners should earnestly turn their attention. Reform, which is urgently needed in many districts, can only be the result of a realization of its urgency, a study of the causes of the disasters and a correct choice of the means of avoiding them. It should be remembered, however, that no action on the part of the mine owners, however great their liberality or however honest their desire to protect the lives of their men, will avail much without a due regard on the part of the men themselves to the rules and regulations laid down for their guidance, and which in most pits are persistently violated. Recklessness on the part of the miners is, after all, the greatest of all the causes of death and injuries in and about mines. Familiarity with danger is apt to make men careless, and without constant vigilance on their part coal mining can never be made much safer than it is now.

The Situation in the Stove Trade.

We invite the attention of manufacturers and dealers to the report of the proceedings of the National Association of Stove Manufacturers, on the second day of its session at Boston last week. As the discussion deals largely with questions of cost and selling price, we have given it in unusual detail, omitting only such portions as seem of minor importance or wholly irrelevant. Much of the discussion is *verbatim*, and as an expression of the views of manufacturers on the subjects of greatest present interest to the trade, it is timely and valuable. It shows very clearly that the stove trade is in a position of peculiar danger, and to carry it safe between Scylla and Charybdis, which loom up on either side, will require skill and courage. The manufacturer seems to be in a position which forces him to choose between losing some part of his trade or following a line of policy, in the hope of retaining it, which cannot fail to lead him into additional difficulty and danger. What a clever manufacturer has called the "millinery" of the business has been carried to a point beyond which it is unsafe to go. Those who seek to lead the styles and set the fashions in ornament and decoration, are in danger of being led into excesses which will prove ruinous. Those, on the other hand, who would gladly abandon useless and costly "frills," and return to plainer styles and better construction, are deterred by the fear that the dealers will not accept anything less magnificent than they are now getting. But the relation of cost to selling price, and the fact that the business does not pay interest on the capital invested, are questions which will not be set aside. They stare the thoughtful manufacturer in the face, and he must look at them, whether he will or not.

The trouble has been, and still is, that manufacturers do not, as the rule, know what their goods cost them. Many are deceived by false estimates, or deluded by overvaluation of nominal assets. They invoice as property or capital much that should be charged to expenses, and so wiped out. Another serious cause of trouble in the trade during the past few years, has been found in the fact that somebody has wanted each season to try an experimental policy at variance with all the established laws of trade. We have watched the results of such experiments with a good deal of interest, and are frequently reminded of the lines:

Then he took his pencil to figure out
How great his gains would be
If he sold his stoves for a tenth their cost:
And, as one may plainly see,
No man who tackles a sum like this
Can do it easily.

Generally speaking, the result of an experimental policy has been to convince those who have ventured thereon that it was easy enough to buy and sell, but that getting gain involves the necessity of charging more for one's product than it costs to manufacture and sell it. Unfortunately, however, one moth seldom learns wisdom from another moth's mishaps in the candle flame; and when one manufacturer is done trying his experimental policy, we usually find another standing ready to begin where he leaves off. In many cases, a reckless policy is inspired by a desire to "freeze out" competition. Mr. Lincoln used to tell a story about a man who was annoyed in the night by a dog, and determining to freeze the animal to death, got out of bed, seized the dog and held him cut th

front door in the hope of accomplishing his purpose. It may have been uncomfortable for the dog, but it cannot be said to have been pleasant or profitable for the man. Freezing out is something very easy to talk about, but if one has to hold the victim he is freezing, one is certain to find it a cold occupation.

The movement to strengthen the market and advance prices, begun in the spring, has already had an excellent effect, and is the only sensible move recorded in the recent history of the stove trade. Even in its partial success it has averted the danger of further demoralization, and stiffened the backbones of many manufacturers who, without such encouragement, would probably have lacked the courage to save themselves from ruin. The discussion in the National Association, and its moderate recommendation with regard to prices, should be read and considered by local associations throughout the country. These, after all, are the controlling influences in the trade, and harmony of action between them is greatly to be desired.

The display of machine tools at Philadelphia in 1876 was one of the best, if not the best, ever made. In the report on the exhibition of this class of articles made by Dr. Anderson, a British juror, extracts from which we republished early last year, it was characterized as "a magnificent display of refined mechanism, rich in new ideas, full of fresh instruction, and most encouraging in promise of the future." Next to the marvelous accuracy of the tools shown by the American exhibitors, the most striking feature of the exhibit was the display of special tools for all sorts of purposes. It has been these two features of our machine tools that have given them such a reputation abroad, and led to their purchase by nearly every government in Europe, for use in their dockyards and arsenals. Most of the machinery used in the manufacture of small arms by several European governments is of our Springfield type, and considerable of it has been made in this country. A great deal of the machinery in Russian arsenals is from this country. William Sellers, of Philadelphia, has furnished some, and Pratt & Whitney shipped in April, to the Bureau of Engineering of the Russian government, a large invoice of tools, including lathes, planers, drills, milling machines, screw machines, grinding machines, &c. This firm has also sold the Navy Department of the British government a milling machine and planer, and some combination lathe chucks.

As a measure of revenue, the new Canadian Tariff has not thus far proved a success. The revenue received from customs during the six weeks between March 15 and April 30, which comprise the period during which the amended tariff has been in operation, was \$935,077. For the corresponding period of last year it was \$1,432,506. This shows a loss of revenue under the tariff of \$547,007. With this falling off in customs revenues amounting to about 67 per cent., we have a loss of trade represented by a shrinkage of \$5,021,449 in the value of imports, which appears from a comparison of the statistics of the two periods named. At this rate the government will have but a poor showing to make at the end of the year.

The steel made from Cleveland iron with the aid of the Thomas-Gilchrist process, is now being applied to various uses to test its quality. Recently, for instance, Messrs. Holdsworth, of Stockton, England, manufactured slit nail rods from ingots made from steel made by Messrs. Bolekow, Vaughan & Co., specimens of which were pronounced to be of excellent quality.

A Large and Prosperous Trades Union.

In 1851, a number of trade societies in England merged into one union, called the "Amalgamated Society of Engineers, Machinists, Millwrights, Smiths and Pattern-makers." This union is a very large and powerful one, which has, during its 28 years of existence, reached a membership of 45,408, and controls a balance in hand, exclusive of branch and other property, of \$1,277,000. There are 399 branches of the society, distributed as follows: England and Wales, 291; Scotland, 41; Ireland, 14; British colonies, 20; foreign, 3; and United States, 31. From this it will be seen that the society has succeeded in gaining quite a foothold even in this country. A person seeking admission into the society must have worked at the trade for five years before the age of 21, and be able to command the current wages of the district where he is working when proposed as a candidate. The scale of entrance fees ranges from \$3.63 for those under 25 years of age, to \$14.52 for those not exceeding 40 years of age, above which age no one is permitted to join. The contributions are fixed at 24 cents per week, but in case the funds are reduced below \$14.52 per member, this sum may "be increased by such sum per week as will sustain the funds at that amount."

The benefits provided for in the rules are: Sickness, \$2.42 per week for 26 weeks, and \$1.21 per week afterward, so long as the illness continues; funeral benefit, death of member, \$58.08; member's wife, \$24.20; accident benefit, \$48.4; superannuation, from \$1.69 to \$2.42 per week, according to his term of membership; out-of-work pay, \$2.42 per week for 14 weeks, \$1.69 for 30 weeks, and a further sum of \$1.45 per week so long as he continues out of employment; emigration benefit, \$29.04; and strike pay, \$2.42 per week, with extra by levies.

The net income of the society, almost entirely derived from contributions, fines and levies, was \$600,000 in 1878, while the total expenditure was \$714,000, an excess of outlay over income of \$114,000. The chief item of expenditure was the sum of \$365,672, paid as benefits to 3000 members out of work, and it is a significant indication for

the depressed condition of English machinery and engineering industries, that this sum is greater by \$95,000 than that disbursed for a similar purpose in the preceding year, 1877. No less than \$116,000 were expended for the relief of sick members, while \$76,000 went to the aged and infirm, and \$38,000 were disbursed as funeral allowances. The cost of management footed up \$73,000. Only \$13,000 were voted for the maintenance of strikers, and \$10,000 were actually spent for that purpose, and it is a fact well worthy of attention that of all the amounts paid out in 28 years, aggregated a total of \$7,345,000, only \$111,000 were standing the fact that during the last year the drain on its resources has been great, it has stood the strain well, which shows how powerful an organization it is. As \$26,000 of its income, or 4 per cent., was derived from the United States, it will be seen that in this country, which has 8 per cent. of its branches, it is represented by many organizations which are numerically weak. We do not think that any foreign society can long retain the allegiance of those who make their homes in this country. Among the more intelligent immigrants there are many who never become citizens, but their children know no sentiment of loyalty to the mother country, and inherited prejudices disappear in the crucible of a political system which has thus far fused the most antagonistic elements into the homogeneous nationality we call the American people.

Warnings Against Alleged Infringements of Patents.

The editorial article in our issue of May 15th, under the above title, has called out the following tardy communication from Messrs. J. B. Young & Co. The only comment we consider necessary is that we fail to see, from reading this communication and rereading the editorial to which it refers, wherein we did any one injustice. The case is of interest at all only as involving questions of law touching what has become a very common custom in the trade—the publication of circulars warning manufacturers and dealers against alleged infringements of patents. We are sorry to learn that the case cannot be appealed. In our judgment, the question of malicious libel turned upon whether, under their patents, Jones & Laughlins had a right to claim both process and product, and to warn the trade in good faith against incurring the liability which, in their judgment, would attach to the use of the Seaman Rolls. On such a point the decisions of a State court are worth nothing:

PITTSBURGH, June 17, 1879.
To the Editor of The Iron Age.—DEAR SIR: In an article, "Warnings against Alleged Infringements of Patents," published in your issue of May 15, 1879, you have, we believe unwittingly, incorrectly stated, in some material points, the facts in the case of Seaman et al. vs. Jones & Laughlins. That was an action for the malicious publication of a circular which falsely stated that all persons who use "Seaman Rolls" for rolling, finishing or polishing iron or steel, so as to produce a smooth or polished surface, are infringing rights secured to Jones & Laughlins by letters patent for cold rolling and polishing iron or steel. The circular prohibited the use of the "Seaman Rolls" in rolling iron or steel, hot or cold, while the letters patent of Jones & Laughlins for polishing iron or steel require the metal to be in an absolutely cold state, "devoid of artificial heat," before it is rolled. The process on "Seaman Rolls" requires heat in the iron or steel, in order to obtain the bright blue finish which is distinctive of its product. The judge, on the trial of the case, ruled that the process used on "Seaman Rolls," and described in his patent, was not an infringement on the patent of Jones & Laughlins, for polishing iron or steel. Indeed on the trial of the case this was virtually admitted by two of the partners of Jones & Laughlins, who were examined as witnesses. Thus the case stood, that the circular was false as to the polishing process. Jones & Laughlins, however, claimed in addition that the process described in the Seaman patent was an infringement of their letters patent for cold rolling iron or steel. They introduced patent reissued in 1876 to support this claim. The original patent spoke of rolling iron or steel in "virtually" a cold state, and was issued in 1859; but though Messrs. Seaman, the plaintiffs, offered the original in evidence, the counsel of Jones & Laughlins objected to it on the ground that they could not in this action attack the validity of the reissue in 1876, and the court rejected the offer. This left the case with the reissued patent only in evidence, and in that one it is said that "cold rolling" may be begun while the iron or steel retains some artificial heat. Jones & Laughlins then claimed that "Seaman Rolls" were used for rolling iron or steel so as to infringe this reissue. Numerous witnesses were examined on either side, and the result of the evidence was this:

1. That in rolling steel on "Seaman Rolls" it was rolled at as high, if not at a higher, degree of heat than was ordinarily used in 1859, and hence it was hardly combatted, but that there was no infringement in rolling steel.
2. Small-sized iron bar, such as are rolled on No. 0 of "Seaman Rolls," are rolled at substantially the same temperature as they were before 1859, and hence there was no infringement as to that.
3. The court left it to the jury to say whether the larger bars of iron rolled in the manner prescribed in Seaman's patent were rolled at such a temperature as to amount to "cold rolling."

The jury found for plaintiffs and the court entered judgment on the verdict. The court did not charge that rolling at a red heat was an infringement of either of Jones & Laughlins' patents. They did charge that to enable the plaintiffs to recover the jury must find,

1. That the circular was false in some material statement.
2. That the firm of Jones & Laughlins did not issue it in good faith, but maliciously.
3. That the advice of counsel could not shield Jones & Laughlins from responsibility

for malicious publication of a falsehood, but that advice of counsel should be considered by the jury in passing on the question of malice.

The plaintiffs claimed that the advice of counsel referred to was given on a partial and incorrect statement of the mode of rolling on "Seaman Rolls."

The defendants cannot remove this case to the United States courts, nor is the jurisdiction of State courts in these actions doubtful. The Supreme Court of Pennsylvania in the following cases have so ruled: *Bellas vs. Hays*, 5 Searg. & R. 427. *Slemmer's Appeal*, 58 Pennsylvania St., 152. By the verdict and judgment in this case the falsity of the Jones & Laughlins circular is conclusively established.

This is a true and fair statement of the case; and while we don't propose to raise any question as to the publication of the article referred to, we must say that we think we have been unfairly treated, more particularly in the editorial comments. This, we think, will clearly appear to you on comparing your article with the foregoing, and we think further that you will make the amendment necessary, as far as possible, to counteract the article referred to, which we conceive to have injured us about as much as the J. & L. circular, and this was no little.

We leave the manner of rectification to you, but rectification we claim as our right. Yours, truly,

JAMES B. YOUNG & Co.
The following is the circular in which Messrs. James B. Young & Co. announce the decision awarding them 6 1/4 cents damages, with costs to the defendants:

PITTSBURGH, June 5, 1879.
To All Whom It May Concern: Notice is hereby given that in the Court of Common Pleas No. 2, of Allegheny County, Pennsylvania, we brought an action against Messrs. Jones & Laughlins for the issuing by them of their circular, dated August 1, 1877, wherein they assert that the use of "Seaman's Rolls," for the purposes therein named, is an infringement of Jones & Laughlins' letters patent for cold rolling and polishing iron and steel, which circular we claimed, in said action, to be false and defamatory. Upon the trial of this action the jury found for us, and on this verdict the Court, on June 2, 1879, entered judgment against Jones & Laughlins, and in our favor. The issue of this circular is deemed proper to correct any misapprehension created by Jones & Laughlins' circular, and we trust that this judicial determination of the incorrectness of the latter will satisfy the public that they can safely purchase and use the Seaman Rolls. Very respectfully yours,

JAMES B. YOUNG & Co.
The Outlook for British Trade and Industry.

Col. Shaw, U. S. Consul at Manchester, in a recent report to the State Department, discusses as follows the position of and outlook for British trade and industry:

The exceptional condition of national affairs, first, during our civil war, and second, during the Franco-Prussian almost immediately following, led to vast additions to the producing power of manufacturers in Manchester. The almost unlimited demand for the manufactures of cotton, woolens, steel and iron, impressed capitalists with a belief that a lasting trade had been secured, and immense sums were expended in building new factories and promoting new enterprises. The return of peace was followed by an unexpected and wonderful development of manufactures, both in the United States and in other countries, and, as a consequence, the prosperity of Manchester manufacturers received a serious check. What the result is to be no one is now able to divine. Many believe that the "free trade" policy of England must be changed, in view of the attitude of friendly powers upon commercial policies, to save her manufactures from ultimate ruin; more hold that the hard times are caused by overproduction at home and widespread financial depression abroad, and that the dangers of the present will pass away with the advent of prosperous times. A small minority prophesy that the United States are about to prove able to successfully compete with all the world on even terms, and then outstrip them all in commercial rivalry for first place. Finally, a great majority are waiting like a multitude watching the archer's arrow shot into the air, wondering where it will come down and if they are in danger of being struck by it in its fall.

The policy of England has long been to encourage the free introduction of all raw materials, with a view of manufacturing the same, and selling their products to the countries whence these were exported. If, therefore, competition becomes so keen from abroad as to enable the producers of raw materials to convert them into manufactures at home, and then substitute manufactures for exportation in place of raw materials, there will be a strong likelihood that the present commercial policy of England will eventually be modified by establishing a duty on certain classes of manufactures, so as to compel the exportation of the raw materials again. Vigorous and frequent articles are constantly appearing in English newspapers, complaining bitterly about foreign tariffs, and pointing out that, while the markets here are free to all, the tariffs of other countries, in many lines, practically shut out the English manufacturer. Public sentiment is evidently undergoing considerable change in regard to the advisability of continuing the present trade policy here, in view of the fact that other nations, which are sharp competitors with England for an enlarged commerce, hold to so-called "hostile tariffs." The present distress among English manufacturers will, if not speedily relieved, assume alarming proportions. Indeed, it has already become more serious than the general public are aware. In view of this condition of commercial affairs, the constant, and in many lines the increasing, shipments of American manufactures into Great Britain must, sooner or later, create discontent among English manufacturers. Already a very strong feeling exists against the so-called injustice of allowing American manufacturers a free market here, while American

markets are not profitably accessible to English manufactures, owing to the tariff. The result, it may reasonably be expected, will be the imposition of a tariff upon American manufactures, and this, too, at a not very distant day.

The popular sentiment, now, it is undoubtedly true, is overwhelmingly in favor of free trade; but, with increasing distress among manufacturers, with drooping industries and failures on every hand, with discontented and idle operatives, it is only reasonable to expect that English manufacturers will, as a measure of relief and a promise of better results, insist on "reciprocity in trade or reciprocity in tariffs." It is easy to favor free trade so long as it is profitable for manufacturers to do so; but when it invites ruinous competition from abroad, without extending free markets, it does not generally take long for this vitally interested class to change their minds about the wisdom or practicability of any commercial policy and clamor for a change of laws. At present some of the ablest writers in England are endeavoring to account satisfactorily for the widespread depression in the great manufacturing strongholds of the nation.

The supplementary report contains the following observations with respect to the present state of industry in Great Britain: A very large majority of the manufacturers have lost money on the operations of the year, while many mills have been permanently closed. The distress that has prevailed during the past two months among operatives has been even greater than it was during the great cotton famine in 1864. The winter has been exceptionally severe, and business of all kinds exceptionally depressed. The demand for English manufactures from abroad has fallen off to an extent unknown in late years, and there appears no immediate prospect of a revival of trade.

The outlook is regarded with increasing forebodings by those best able to form a reasonably accurate opinion of the prospects for manufacturers in the near future, so far as Lancashire is concerned. The causes which have brought about this state of trade are not yet clear to the great majority in England, and there is a wide difference of opinion as to the means best adapted to enable the manufacturers to regain their former prestige and secure the return of comparative prosperity. The present law regulating the hours of labor—limiting them to 56 hours a week—is believed to act to the disadvantage of manufacturers here, inasmuch as American operatives work longer time per week in the aggregate. The general depression in all branches of trade at present, together with increasing dullness in all commercial enterprises, are so patent to all, that it is now simply a question of more work and less pay or no work at all for a vast army of operatives. This view is having its influence on the working classes, and the changes named will undoubtedly follow; still, discontented operatives, especially in England, are an element exceedingly difficult to manage, and the outlook is far from being satisfactory to the vital interests of manufacturers. There has been much sentimental legislation brought to bear upon the abstract and commercial question of capital and labor in England during the past few years, the evil results of which are being seriously felt in many manufacturing centers at present.

My observations among the operatives here lead me to believe that the fashion of "beer drinking" is a great drawback to their efficiency. In many instances, husband, wife and children drink beer, and often in large quantities. This habit breeds much misery. It deadens the healthy physical powers, weakens the intellect and robs the pockets of operatives. It must, in a majority of cases, tend to lower the standard of skilled labor, and in all cases increases the burden which is now pressing so heavily upon manufacturers, in this, that the habit is expensive, and this expense enters into the question of wages. If English operatives should cease drinking beer, it would, as a rule, enable them to accept a reduction of more than 10 per cent. in wages as compared with present prices, and still make equal provision for the support of their families.

Steam Heating for New York.

The Spinoia steam-heating project, which has occupied the attention of the Commissioners of the Sinking Fund for several months, was again under discussion before that body on Monday last. All the commissioners, consisting of Mayor Cooper, Recorder Hackett, Controller Kelly, Chamberlain Tappan and Mr. Nicholas Houghton, the chairman of the Finance Committee of the Common Council, were present. The following communication was presented:

To the Commissioners of the Sinking Fund.—GENTLEMEN: In behalf of myself and my associates, I respectfully call your attention to the great benefits the city and its inhabitants will derive by the introduction of "Holly's steam combination system" for heating, cooking, and all other purposes for which steam can be used when introduced by this system. In the first place, it will be a saving of not less than \$150,000 a year in the heating of the public buildings. It will also save the city from \$300,000 to \$500,000 per annum in the removal of ashes from the dwellings, and snow and ice from the principal streets and avenues. Also a large saving by the furnishing of steam for the fire engines of the city. The city will also receive \$150,000 from the company for the permission to lay the pipes for conveying steam in its streets and avenues, and a further compensation of 3 per cent. of the earnings of the company, after they have earned and paid a dividend of 10 per cent. upon their capital stock. The system, when fully developed in this city, will reduce the rates of insurance upon all kinds of insurable property of the business community at least one-half, when the shops and storehouses can be heated without the aid of fires to be kindled for that purpose. This will be a saving of many millions of dollars annually from the present cost. A bond in the sum of \$50,000 is to be given to the city for the replacing, under the direction of the Commissioner of Public Works, all pavement taken

up, or in any way disturbed, by the laying of the pipes, while its cleanliness and many advantages to the housekeeper cannot be estimated too highly. The Holly system of steam heating is no longer an experiment, but a fully developed, practical invention, which, in a very few years, will be generally used throughout the country. Very respectfully,
FRANCIS B. SPINOIA,
For Himself and Associates.

At the previous session ex-Judge Pierpont applied to have the grant given to Spinoia and his associates, to lay steam mains south of Chambers street, amended so as to permit the mains to be laid north of that thoroughfare. It was finally decided to allow them to use the section of the city south of Canal street for the purpose. The Commissioners subsequently requested the Corporation Council to embody in legal and appropriate language the terms, restrictions and limitations on which they proposed to grant the privilege asked for by Spinoia and his associates, and the latter, in compliance with their request, revised the original resolutions on the subject. The conditions read as follows:

First.—That in all cases where the pavements are to be disturbed for the purpose of laying or repairing said mains, a permit therefor shall be obtained from the Commissioner of Public Works, and the grantees, before taking out such permit, shall file with the Controller of the City and County of New York a bond for \$50,000, with sufficient and adequate security, to be approved by the Controller, to be renewed from time to time as the Controller may require, as a guarantee that the pavements of the streets and sidewalks shall be restored in as good condition as they were found at the time they were disturbed to lay said steam pipes, and entirely to the satisfaction of the Commissioner of Public Works; and, unless this be fully complied with, the proper authorities shall be fully empowered to commence legal proceedings against the signers of the bond, for the amount which it may have cost the city to restore said pavements in good condition. The pipes shall be laid under such regulations as the Commissioner of Public Works may from time to time establish, and under such part of roadway or sidewalk as he may prescribe on the permit, and if at any time the Commissioner of Public Works shall direct any changes to be made in the location or arrangement of said steam pipes for the purpose of the laying, altering, or removing city water pipes or sewers, or doing any other public work, such changes shall be made by the grantees at their own expense, under the direction of the Commissioner of Public Works; and in no case shall the city be liable for any injury or damage to the said steam pipes, and in laying said steam pipes the grantees shall in no wise interfere with any sewers, water pipes, or other pipe theretofore laid, without the consent of the Commissioner of Public Works and the owners of said pipes.

Second.—The grantees shall supply all the steam required by the city for any purpose in the streets, or the parts thereof, in which the steam pipes are laid, or for heating any public building now or hereafter located therein, at 25 per cent. less rates than steam is furnished by them to their most favored customer. And the grantees shall authorize the city to use for public purposes, without royalty, any patented appliances or apparatus for the use of the steam supplied by the grantees, which the grantees shall authorize or license any person to use.

Third.—Said Francis B. Spinoia, for himself and his associates, whenever requested by the proper authorities having charge of such matters, shall furnish steam for the purpose of cleaning the principal streets, public places and avenues from snow or ice, and also supply steam for the use of the fire-engines, at reasonable rates, wherever their mains and pipes shall be laid.

Fourth.—Said Francis B. Spinoia, for himself and his associates, shall pay into the Sinking Fund, for the benefit of the City of New York, the sum of 3 cents for each lineal foot of mains and pipes laid by them beneath the carriage or road way of any street, avenue, or public place in the city, until such payments shall have amounted to \$150,000, after which the said payments shall cease and terminate, and in addition to said 3 cents for such lineal foot, in each year in which the company's earnings shall exceed 10 per cent. on the amount invested, the next 3 per cent. earned in the same year, over 10 per cent. on the amount invested, shall be paid into the City Treasury to the credit of the Sinking Fund for the redemption of the city debt.

Fifth.—That Francis B. Spinoia, for himself and his associates, be authorized to lay mains or pipes within the district in the City of New York, south of Canal street, in a direct line from the North to the East River. And after having laid the pipes in said district to the satisfaction of the Commissioners of the Sinking Fund, then the said Francis B. Spinoia and his associates are hereby granted permission to lay pipes in all the streets, lanes, alleys and places in the city, under the terms, limitations, restrictions and conditions hereby fixed.

Sixth.—That the right to lay steam pipes shall cease and determine at the expiration of three years from this date, unless the grantees shall, within that time, have constructed the apparatus and laid the pipes necessary to supply steam in 25 miles of streets.

These conditions elicited considerable discussion. Mayor Cooper said he was opposed to them, and contended that the city should receive a much larger revenue from the undertaking. The question was finally put, and the Controller, the Recorder, the Chamberlain, and Alderman Houghton voted in favor of giving the franchise to Spinoia and his associates on the terms named, the Mayor being in the negative. A resolution was then adopted rescinding the one previously passed, providing that the action of the commissioners should be subject to the approval of the Common Council. This was carried by the votes of the Controller, the Recorder, and the Chamberlain, the Mayor and Alderman Houghton opposing it.

It is announced that the Faraday will leave Chariton on Wednesday for Brest, with a large portion of the new French cable on board.

Special Notices

WANTED TO LEASE.—An Iron Foundry within 25 miles of New York City. Size of building about 25x50. Capacity of cupola, 2 tons. Please address L. M., 250, Office of *The Iron Age*, 83 Reade St., New York.

mand is very fair and business is entirely satisfactory, except in the matter of prices. An order for about 300 tons of Beams for a city brewery has been taken during the week, but at a figure which cannot leave much margin for the seller. In a general way the market may be called firmer, although the sale referred to was at an exceptionally low price. Angles in small lots are in active demand, and in most cases command slightly higher prices. We quote same as last week: Angles, 2 1/2" @ 2.3¢; Tees, 2 3/4" @ 2.4¢; Beams and Channels, 2 5/8" @ 2.7¢, according to specification.

Plate and Tank Iron.—We have again to report good demand for Plate Iron, with sales during the week, in moderate sized lots, to the extent of 1000 or 1200 tons. Half this amount has been taken for bridge purposes, the balance being for general work, mostly in the shipyards. The mills are well situated as regards orders, but prices are very low, and although manufacturers ask higher prices, it is difficult to obtain any advance at this season. It is confidently expected that in this respect an improvement will be realized after midsummer, although in the meantime buyers can place their orders at former figures. Skelp Iron continues active, and in addition to several sales during the week at full prices, further orders are in the market. We quote Skelp, 1.0¢ @ 2¢; Sheared ditto, 2.2¢ @ 2.3¢; Common Plates, 2.2¢ @ 2.3¢; Tank Iron, 2.2¢ @ 2.4¢; C. No. 1, 2.4¢ @ 2.6¢; Shell Iron, 2.75¢ @ 2.9¢; Flange Iron, 3.7¢ @ 4¢; Solid Firebox, 4.85¢ @ 5¢, and Best Bloom, 5.5¢ @ 6¢.

Sheet Iron.—The demand continues active, and a large amount of business has been done since date of our last report. Galvanized Iron is also very active, and sales are said to have been larger than at any time in the history of the trade. Sellers are not pushing business, as prices are said to leave very little margin to the manufacturer, and it is believed that higher rates must prevail as the season advances. In the meantime we quote for small lots as follows: Common Sheet, No. 20 to 23, 3.2¢ @ 3.3¢; No. 24 to 25, 3.4¢ @ 3.5¢; Best Refined Sheet, No. 25 to 28, 3.6¢ @ 3.7¢; No. 16 to 24, 3.4¢ @ 3.5¢; Best Bloom Sheets, No. 16 to 24, 5.5¢ @ 5.7¢; No. 25 to 28, 5.8¢ @ 6¢; Refined Plates or Blue Annealed, 5-16 to 16, 2.6¢ @ 2.7¢; Best Bloom, 5-16 to 16, 5.3¢ @ 5.5¢; A Patent Planished, 10 1/2" @ 16, 2.6¢ @ 2.7¢; Best Blooms Galvanized, 45¢ discount; second quality, 55¢; extra discounts for large lots.

Bar Iron.—There is no change in the condition of the trade. A fair amount of business is doing at full prices, but there is no urgency either to buy or sell. The tendency of the market is toward higher prices, and all the indications point to an advance at no distant date. The certainty that material, fuel and other items are all at the lowest point, and liable to advance at short notice, prevents sellers from entering into extended engagements; and, as consumption is unusually heavy, higher prices in the near future are regarded as an absolute certainty. In the meantime, although the market is very firm, we quote 1.8¢ to 2.0¢, according to quality.

Axles.—Are very active. Sales to a considerable amount have been effected within the week at full prices, with further orders offering.

Steel Rails.—The market is without special change, although we notice sales to a larger extent than might be expected with mills so crowded with work as they are understood to be. One sale of 5000 tons has been closed to-day, and others to the extent of 10,000 additional are said to have been placed within a week. Prices have not been made public, but there is reason to believe that important concessions have been made for late deliveries. Full prices are, no doubt, exacted for prompt delivery, but there is evidently a disposition to shade prices in preference to losing orders for winter and spring work. We quote \$44 @ \$46, at mill, as nominal prices, with sales of small lots at these figures for prompt delivery.

Iron Rails.—We have again to report a very active market, with actual sales to the extent of nearly 10,000 tons. We hear of three lots—viz., 4000, 2000 and 1500 tons—having been closed, in addition to several small lots, with further orders in the market to the extent of 15,000 tons. Prices are again firmer, although one important order was taken at a price materially below our quotations. The extreme range of prices at which business has been done is \$35.50 @ \$39.50, at mill, with \$37 now quoted as a minimum price for ordinary sections. The high price demanded for Old Rails and other material compels manufacturers to insist on an advance, and there is little probability of orders being placed unless at full prices—say, \$37 @ \$39, at mill, according to location, section of Rail, &c.

Old Rails.—A large business has been done during the week, prices showing a further advance, without at all checking the demand. Sales of 2000 tons foreign Rails are reported at \$23.50, small lots at \$23.75, and \$24 asked for lots to arrive. So far as we can learn, the market is still bare of stock, so that sellers are not likely to make concessions at present. The fact of the matter is that consumption is beyond precedent, so that when Rails are offered, they are eagerly taken, without much regard to price. The scarcity of low grades of Pig Iron has considerable influence on the market, although a reaction is still looked for, and may occur at any time. In the meantime, buyers are as eager as ever, and good lots would to-day command prompt sale at \$23.50. The market is absolutely bare of stock, and \$24 is asked for lots to arrive, with buyers at \$23 @ \$23.50.

Spikes.—Are in active demand at full prices, viz.: 5/8 x 9-16, 2 1/4¢; 1/2 x 4 and longer, 2 1/4¢; 7-16 x 4 and longer, 2.6¢; 3/8 x 3 1/2 and longer, 3¢.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., June 24, 1879.

While general business is slackening off somewhat, a more hopeful feeling prevails, which is stimulated by the fact that the volume of business the second quarter of the year has, both in manufacturing and mer-

cantile circles, exceeded that of same time of any former year for some years past, and what is equally, if not still more important, is that values have been maintained better. There is not the same disposition to cut prices that there has been. Our manufacturers have come to the conclusion that they have worked for nothing, or at a loss, about long enough; and, besides, there is no necessity for it now, as competition is not so strong. The consumption of nearly all kinds of manufactured goods is increasing, while in this important particular things are in better shape than they have been at any time since the panic. There is now every indication of a good fall trade; stocks of nearly all kinds of manufactured goods are light, both in first and second hands, while consumption is increasing.

Another important and encouraging matter worthy of mention in this connection, is that late and reliable advices from the South report that there is no yellow fever, nor is there likely to be this summer; and, moreover, the cotton and other crops are said to be looking splendidly. Last year the Southern trade was very much curtailed by the terrible scourge that prevailed from July until November, but if, as now seems probable, there should be no epidemic, and the crops turn out as well as expected, we look for a largely increased demand from that quarter this fall for all kinds of manufactured goods.

Pig Iron.—While business is not so active, it is all that can be expected at this season. It is customary with many of the mills to stop next month to take stock and make repairs, and they make it a point, ordinarily, to have as little stock of raw iron on hand as possible at that time. Hence the demand just now is of a hand-to-mouth character, but the tone of the market is that of firmness, and the tendency is unmistakably upward. Some of our commission merchants report that they have been instructed by their principals, within the past week, to demand an advance. The cost of production is greater than it was a year ago, as ores and coke are higher, with labor tending in the same direction; hence it is not strange that furnacemen are very firm, and some of them already, notwithstanding this is the dull season, demanding an advance. The visible supply—not only here, but in the Shenango and Mahoning valleys—is light, unusually so; but very few of the furnaces have "piled up" any for a year or more past, and furnacemen are more sanguine of remunerative prices now than they have been at any time since the panic. Bituminous Coal Smelted Irons are quotable as follows: Foundry, \$19 @ \$21, 4¢; Mill, \$15 @ \$17, for White and Mottled; \$18 @ \$18.50 for cinder mixture Red Short, and \$19.50 @ \$20 for all ore. Bessemer—Small sales for foundry use at \$21.50 @ \$22, 4 mos. Coke Irons—Sales of Mill at \$16 @ \$16.50, cash, for best brands—the outside figure an advance. Anthracite—Foundry, \$20 @ \$22, 4 mos., and Neutral Forge, \$16.50 @ \$17, cash. Charcoal—Sales of Cold Blast at \$26, cash, to \$30.50, 4 mos. There has not been a single sale of Blooms reported for several weeks.

Manufactured Iron.—Some of the mills are very full of orders and pressed to their full capacity, and business in general is more active than usual at this season of the year. One of the largest mills is so pressed to keep up with its orders that the proprietors cannot find time to stop even a couple of days to make needed repairs. It looks very much now as if there was going to be an active trade all summer, as stocks are light and the consumption increasing; and while there has as yet been no actual advance, a firmer feeling is being developed, and manufacturers are not inclined to make contracts for forward delivery at current rates. It is about as well established as anything can be that the cost of production is down to the lowest limit. There is no prospect of any reduction in labor, and raw iron is tending upward; hence, if the rates now ruling, as is claimed, afford no margin for profit, it behooves the manufacturers to put up prices, and this they will no doubt do before long. We continue to quote Bars at 1.70¢ @ 1.75¢ 60 days, 2 per cent off for cash; Sheets, 2.75¢ @ 2.80¢ for No. 24; Tank, 2.40¢ @ 2.50¢.

Nails.—There is not so much inquiry as there was a few weeks ago; nor is it to be expected, as the spring trade is about over and the demand is likely to continue light until the fall trade opens, which is usually in August. Two of our factories have been started up. Jones & Laughlins, Chess, Smythe & Co., Shoenberger & Co., Zug & Co., and Graff, Bennett & Co. are still idle. Zug & Co. have not made a nail since last July. Prices are weaker, and as compared with a few weeks ago, are irregular. We hear of sales of car lots at \$2.05, 60 days, 2 per cent. off for cash, and in a jobbing way at \$2.15. At Wheeling the car remains unchanged at \$1.90, 60 days; but we understand that there are no sellers there under \$2.00 net cash, and that the manufacturers, with a single exception, would like to put the price to \$2.25. Nails are too low in the West as compared with Iron, and should, in justice to manufacturers, be advanced. The regular monthly meeting of the Western Association takes place here on the second Wednesday of July, and it is probable that some action will be taken in regard to prices.

Horse and Mule Shoes.—There is a fair business, but no change in prices; 100-keg lots, \$3.25 @ \$4.25 per keg; larger lots special rates.

Railroad Spikes.—There is a continued good demand, and price is steady at 2 1/4¢ @ 2 1/2¢, 30 days.

Wrought Iron Pipe.—There is no abatement in the demand for Pipe, and prices are firm; discount on gas and steam, 6 1/2¢ @ 65, the inside figure for small lots. The mills here are all full of orders, and a further reduction in discounts is not improbable. Boiler Tubes still quoted at 50¢ off. Oil Well Casing, 65¢ @ 70¢, net; do. Tubing, 17¢ @ 18¢. There is not much inquiry for the latter, owing to the depressed condition of the oil business.

Rails.—There is no abatement in the demand for Steel Rails, and the market is quoted firm at \$44, cash, delivered on cars

in Pittsburgh. The Edgar Thomson Mill is sold up until November, and looks very much as if they would soon have sufficient orders booked to absorb their entire production during the remainder of the year. Old Steel Rails unchanged at \$25 @ \$26. Old Iron Rails firmer, with a fair inquiry, but prices remain as last quoted, \$22 @ \$23. So far as we can learn there have been no sales in this market above \$23.

Steel.—There is nothing new to note in regard to this important interest. Business continues fairly active, the mills have about all they can do, and prices are steady, but unchanged. Tool Steel, 10 1/2¢ @ 12 1/2¢; Machinery do., 5¢ @ 7¢; Boiler Plate, 6¢ @ 7¢. Steel shafts for steamboats are now being talked of, and the matter will be tested this fall or winter. The consumption of Steel has increased wonderfully within the past few years.

Scrap.—There is a fair business and prices are steady; indeed, for most of the leading articles values are low here when cost at sources of supply are taken into consideration: Old Car Wheels, \$19 @ \$20, gross; Machinery Metal, \$14 @ \$15; Cast Boring, \$10.50 @ \$11; Car Springs, net, \$29 @ \$30; Car Axles, \$27 @ \$28; Wrought Turnings, \$14 @ \$15; No. 1 Wrought Scrap, \$22 @ \$22.50.

Window Glass.—According to agreement all the factories in the West will stop July 1st and remain so until the 1st of September. It is customary to stop during the two months in question in consequence of the hot weather. The business during the first half of this year, so far as relates to Pittsburgh, has been unusually good; in volume it has exceeded that of same time in any former year since the panic, and prices are also firmer and better. It is also worthy of note that notwithstanding the factories here have been running steadily since and including last September, manufacturers' stocks are very light, and some of them are troubled a good deal to know how they are to meet the wants of their customers during the next two months with the factories stopped. Prices firm, but unchanged; car lots, 75¢ and 5¢; in a jobbing way, 70¢ and 10¢ to 75¢. There is some talk of reducing the discount in car-lots to 75¢, straight.

Coke.—There has been nothing particularly new developed in the course of the market recently; business continues fairly active. The demand is sufficient to absorb the production, and while prices remain unchanged, a firmer feeling prevails, owing to the more encouraging outlook in Pig Iron. We continue to quote at \$1.20 @ \$1.30 per ton, delivered free on cars at ovens.

Coal.—The situation continues anything but encouraging for our coal operators; navigation remains suspended, and while it is hoped that there will be a rise soon, the prospect is not very encouraging at the present writing. Stocks in the down-river markets are very much reduced, and prices have gone up in consequence. The quantity loaded here in boats and barges, ready to move as soon as there is water, is estimated at \$15,000,000 bushels, and some operators have all their capital locked up in these black diamonds, and are in an ugly position.

Petroleum.—The completion of the seaboard pipe line has, by competition, stiffened up the market considerably, and by reducing the cost of transportation more than 50%, has enabled producers to obtain a better price for their product. The United Pipe line is delivering crude oil from the producing region at New York at 35¢ per bbl., and Philadelphia and Baltimore at 30¢ per bbl., including pipeage. The pipeage alone was 20¢ per bbl. prior to the reduction in question. Freight on refined oil from here to the seaboard have been reduced more than one-half, and nearly all the standard refineries have been started up. The rates now are: To New York, 50¢ per bbl.; to Philadelphia and Baltimore, 45¢. The outlook is much more encouraging than it has been for some time past—one of the good effects of competition; and the producers, since the completion of the seaboard pipe line, feel that they are no longer at the mercy of the railroads, and Standard Oil Company.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts., Chattanooga, June 23, 1879.

Business in a general way has been fair during the past week. Farm operations are just now quite active. The new crop of wheat, which turns out to be of excellent quality and fair yield, is being thrashed, and small amounts are being marketed at an average of about \$1 per bushel for No. 1 white. Manufacturers in all lines continue to improve. Stocks of all kinds are light, and inquiry has been more brisk than for some time. The weather during the week has been cool for the season, the highest point of the mercury being 84 degrees.

Pig Iron.—The demand continues quite brisk. Prices are steady at quotations. An early advance is confidently looked for by holders and producers. We quote: Coke Irons—No. 1 Foundry, \$17.50 @ \$18.50; No. 2, \$16 @ \$17; Gray Forge, \$14 @ \$15; White and Mottled \$12 @ \$13. Hot-Blast Charcoal—No. 1 Foundry, extra, \$20 @ \$21; ditto, \$18 @ \$20; No. 2 Foundry, \$16 @ \$18; Gray Forge, \$16 @ \$18; White and Mottled, \$15. Cold Blast Charcoal—Car Wheel Metal, \$22.50 @ \$27.50; do., Extra Standard, \$24 @ \$29.50; Forge, \$17 @ \$22.

Muck Bar, &c.—\$27 @ \$34; Old Rails, \$19 @ \$20; Wrought Scrap, \$20 @ \$21. Old rails and wrought scrap are very stiff at quotations, with advancing tendencies.

Ores.—Brown Hematite, 50 to 56¢; per ton, \$1.75 @ \$2.25. Red Fossiliferous, 50 to 56¢; per ton, \$1.20 @ \$1.60. The above prices for ores delivered in Chattanooga on cars, or on the wharf from flat boats.

Nails.—The market is good, but rates do not advance; and this condition continues in spite of the fact that all the Pittsburgh mills are idle. No better evidence could be needed to show that the Nail business has been greatly overdone, and that if one-half the machines in the country were thrown into scrap piles, it would eventually be a wholesome thing for the pockets of their owners, and good for the trade and for consumers. We quote at \$2.25 rates, with usual discount on round lots. The mill here

refused an order for 1000 kegs this week, because the price offered was not satisfactory; and that is about the healthiest item we have recorded in the Nail trade for some time.

Manufactured Iron.—The demand for Bars is fair and stocks are sold low. If there shall be any advance, manufacturers will reap the principal benefit of it. Railroad track fittings are in very good demand. The Vulcan Works have just closed a contract for 80 miles of Splices, Bolts and Spikes for the Gulf, Colorado and Santa Fe. We quote: Bars, 2¢; Railroad Spikes, 2 1/2¢; Light Rail, 2 1/4¢; Track Bolts, 3¢; Trestle Bolts, 4¢.

Coke.—We quote 11¢ @ 15¢ per bushel for washed foundry. Furnace, full supply at \$2 per ton, free on cars at Chattanooga or South Pittsburgh.

Coal.—There is no change in the market nor in prices. We quote run of mine, free on cars in Chattanooga, at \$1.25 @ \$1.75 per ton. Lump, as per quality, 10¢ @ 12¢ per bushel.

Pig Lead.—4¢; Ingot Copper, 18¢.

Iron Rails.—The mill here has all it can do for several months. Prices remain strong, \$36 per ton being an inside figure.

Steel Rails.—We quote at \$47, at the mill, and the demand beyond the ability of the mill to supply.

ST. LOUIS.

St. Louis, Mo., June 23, 1879.

Pig Iron.—There is no change to note in the price of Iron since last week's report. Trade is holding up remarkably well considering the season of the year, which is usually a dull one with us.

CHARCOAL HOT BLAST.
Missouri..... \$10.50 @ 20.00
Southern..... 18.50 @ 19.50
Hanging Rock..... 21.00 @ 22.00

COKE AND COAL.
None offering
Southern, No. 1..... 18.50 @ 19.50
Ohio River, No. 1..... 19.00 @ 21.00
Jackson County, No. 1..... 19.00 @ 20.00
Hocking Valley, No. 1..... 19.00 @ 20.00
Anthracite..... 20.50 @ 21.00
No. 2 and Mill \$1 @ \$2 per ton less.

COLD BLAST.
Missouri..... 25.00 @ 30.00
Southern..... 25.00 @ 30.00
Ohio..... 30.00 @ 32.00

Iron Mountain..... 5.50 @ 6.00
Southwest..... 4.75 @ 5.00
Ore for flux..... 6.50 @ 7.00

Old Rails.—There is considerable inquiry for Old Rails, with few offerings, and 50¢ @ \$1 per ton could be obtained for immediate delivery. We therefore quote \$21 as present market price.

BOSTON.

JUNE 20.—**Pig Iron.**—Our market continues steady and unchanged. The inquiry for Pig is now confined to small parcels, but the outlook is bright, and there is a decided feeling of confidence in the future of the metal. Small lots of Pig Iron from the city stores and wharves readily command \$21.50 @ \$23 per ton for No. 1 X, and \$20 @ \$21 for No. 2 X. **Manufactured Iron.**—Bar is firm and in fair demand from the stores at 1 1/4¢ @ 2¢ per lb; and the mills are still moderately busy on orders booked on a basis of \$41 @ \$42 for large lots of Refined and \$38 for Common. From present appearances the forthcoming summer vacation will not be prolonged from any lack of business. The pronounced feeling of confidence which now exists in this trade is indicated in some degree by the recent action of a Pittsburgh manufacturer, who this week instructed his correspondent at this point to hold firm at \$1.95 on a lot of his Iron which he had previously ordered cleaned out at a concession. Nails continue in good demand at \$2.25 per keg on a rod basis. Sheet Iron is quiet and steady at 2 1/4¢ @ 3¢ for single Common, and 3¢ @ 3 1/2¢ for double do.; 3 1/2¢ @ 4¢ for Refined; 6 1/4¢ @ 6 1/2¢ for Galvanized, Nos. 14 to 20; 6 3/4¢ @ 8 1/2¢ for do., Nos. 21 to 28; 11 1/2¢ @ 12¢ for Russia, perfect, and 1/2¢ less for do. No. 1 stained. Plate iron is in good request at \$2.30 for Shell, \$2.50 for C. No. 1, \$2.75 for Shell, \$3.75 for Flange. These prices are from the mills. Small lots from the stores readily command an advance of 25¢ @ 50¢ above these figures. We quote American Tool Steel at 11 1/4¢ @ 12 1/2¢; English do. at 14 1/2¢ @ 15 1/2¢; American Spring Steel at 5¢ @ 6¢; English do. at 7¢ @ 8¢; Tire Steel at 3 1/2¢ @ 4¢; Bessemer Machinery at 4¢ @ 5 1/2¢, and Cast do. at 5¢ @ 6¢. **Copper.**—Ingot Copper is dull, but prices of Lake are still firmly maintained at 16 1/4¢ @ 17¢. There is no change in manufactures, and we continue to quote New Sheathing at 22¢; Braziers at 24¢ @ 26¢, and Bolts, 24¢; Yellow Metal Sheathing sells at 14¢ @ 14 1/2¢ for American and 12¢ for English in bond. **Lead.**—The demand has been very moderate since our last, and though prices have been firmly maintained at 4¢ for large lots of Pig, very little confidence is felt in the permanency of the late advance. We quote small lots from store: Pig, 4 1/4¢ @ 4 1/2¢; Lead Pipe, 5 1/2¢; Tin-lined Pipe, 12¢; Bar Lead, 6¢; Sheet Lead, 6¢; Block-Tin Pipe, 30¢; all of these except Pig are subject to the usual trade, or 10% discount. These quotations of manufactures are advanced. **Antimony** is still in light demand at 11 1/4¢ for large lots and 12¢ @ 13¢ for smaller parcels. **Spelter** shows no improvement, and though some holders are confident of higher prices in the near future, the market is generally flat. Small lots from store are quoted at 5¢ @ 5 1/4¢, and larger lots from the works at 4 1/2¢ @ 4 3/4¢, according to brand. Sheet Zinc is firm and in fair demand at 6 1/4¢ @ 6 1/2¢, according to size of lots. Tin has still further advanced, and Pig is now held firmly at 15 1/4¢ @ 15 1/2¢ for Straits in large lots. For smaller lots we quote below: Straits, 16¢ @ 16 1/2¢; Banca, 18 1/2¢ @ 19¢; English L. & F., 15 1/2¢ @ 16¢. We quote Plate Charcoal L. C., \$6.50 @ \$7; Coke, \$5.25 @ \$5.75, and Charcoal Terne, \$6 @ \$7.50.—Commercial Bulletin.

CINCINNATI.

Messrs. E. L. HARPER & Co., under date of June 23, write as follows: The market has not manifested any particularly new features since our last review. The demand continues good, and the prospects are in favor of a well-sustained movement throughout the season. The Iron Rail mills are being compelled to decline considerable orders

at remunerative figures because of previous engagements, which demand all they can turn out. Few, if any, special lots of good quality are pressing for sale, and the light supply of Old Rails affects the market for Forge Iron favorably. Unquestionably the market is in a healthier condition than for a long while.

HOT-BLAST FOUNDRY.
Hanging Rock C. C. No. 1..... \$21.00 @ 22.00
C. C. No. 2..... 19.50 @ 20.00
Hanging Rock Coke and S. C. No. 1..... 17.50 @ 18.00
S. C. No. 2..... 15.00 @ 17.00
Virginia Coke, No. 1..... 18.50 @ 19.00
No. 2..... 18.50 @ 19.00
Shawnee S. C. No. 1..... 20.00 @ 21.00
Hocking Valley S. C. No. 1..... 17.00 @ 18.00
S. C. No. 2..... 17.00 @ 17.50
Southern Coke, No. 1..... 20.00 @ 20.50
No. 2..... 19.00 @ 20.00
No. 3..... 18.00 @ 19.00

FORGE IRONS.
Hanging Rock, No. 1 C. C..... 18.50 @ 19.00
Hanging Rock, No. 1 Coke..... 17.00 @ 17.50
Longdale, No. 1 Coke..... 18.00 @ 18.50
Ala. and Tenn. No. 1 C. C..... 17.50 @ 18.00
Red-short, No. 1 Coke..... 18.50 @ 19.00
Cold-short, No. 1..... 15.50 @ 16.00
Old Rails prime..... 22.00 @ 23.00
Southern Coke..... 18.50 @ 19.50

CAR WHEEL AND MALLEABLE.
Hanging Rock C. B..... 28.00 @ 30.00
Cherokee C. B..... 28.00 @ 30.00
Southern and Western Brands..... 26.00 @ 28.00

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of June 23, write us as follows: The volume of business is large, both for immediate and future delivery. Prices are firm. The usual time, 4 mos., is allowed on the quotations below:

FOUNDRY IRONS.
No. 1 Hanging Rock, Charcoal..... \$21.00 @ 22.00
No. 2 Southern, Charcoal..... 18.50 @ 19.00
No. 3 Hanging Rock, Stonecoal and Coke..... 19.00 @ 19.50
No. 4 Hanging Rock, Stonecoal and Coke..... 18.00 @ 18.50
No. 5 Southern, Stonecoal and Coke..... 18.50 @ 19.00
No. 6 American Scotch..... 17.50 @ 18.00
Silver Gray..... 15.00 @ 17.00

MILL IRONS.
No. 1 Charcoal, Cold-short and Neut'l..... 17.00 @ 18.50
No. 2 Stonecoal and Coke, Cold-short and Neut'l..... 16.50 @ 17.00
No. 3 Stonecoal and Coke, Cold-short and Neut'l..... 16.00 @ 16.50
No. 4 Missouri and Indiana Red-short..... 20.00 @ 21.00
White and Mottled, Cold-short and Neut'l..... 15.50 @ 16.00

CAR WHEEL AND MALLEABLE IRONS.
Hanging Rock, Cold-blast..... 28.00 @ 30.00
Alabama and Georgia, Cold-blast..... 26.00 @ 28.00
Kentucky, Cold-blast..... 27.00 @ 30.00

W. B. BELKNAP & Co., Iron and Steel merchants, Nos. 113 and 115 West Main street, under date of June 23, write as follows: We have to chronicle another week of fair and steady general business, and of activity at the rolling mills quite unexampled for the season. We have not since the panic seen so much stir and bustle and hopefulness about the future in Iron circles. There is every indication that the demand for Iron for railroad construction and equipment, large as it is, will increase rather than decline from this time forward. Certain improvements in the railway system of Louisville, in the way of branch extensions and through connections, will not be much longer delayed, and the completion of the Big Sandy connection with the Chesapeake and Ohio, and of the St. Louis Air Line, will bridge the gaps at present existing in the best and shortest through route from the West to the Atlantic seaboard. Demand for new rolling stock continues heavy, and the Ohio Falls Car Works finds its immense capacity taxed to supply it. The market, both for Pig and Manufactured Iron, may be quoted strong, with an advancing tendency. The agricultural situation is fairly good in spite of early droughts, and wheat is now being harvested in average quantity and much more than average quality. A prosperous business year seems certain if Congress can only keep its hands off the currency and let well enough alone.

BALTIMORE.

Mr. W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of June 23: Trade for the past week has ruled very fair and improving, with values firm and unchanged at annexed figures:

Refined Bar Iron, 1 to 6 by 3/4 to 1 1/2 @ 1.90 @ 2.00
" 1 to 4 by 1 1/2 to 2 @ 1.90 @ 2.00
" 1/2 to 1, Round..... 1.90 @ 2.00
" and Square..... 1.90 @ 2.00
Hoop Iron, 1/4 wide and upward..... 2.50 @ 2.60
Band Iron, from 1/4 to 1 in. wide..... 2.50 @ 2.60
Home-shoe Iron..... 3.00 @ 3.10
Norway Nail Rods..... 3.00 @ 3.10
Black Diamond Cast Steel..... 12.50 @ 13.00
Machinery Steel..... 7.00 @ 8.00
Cast Spring Steel..... 4.50 @ 5.00
Homogeneous Steel Plate..... 10.00 @ 11.00
Common Horse Nails..... 10.00 @ 11.00
R. R. Spikes, 5 1/2 x 10..... 2.50 @ 2.60
Perkins' Horse shoes, 1/2 keg of 100 lbs..... 3.75 @ 4.00
" Mule shoes..... 1.00 @ 1.10

Putnam Horse Nails..... 10.00 @ 11.00
Globe Horse Nails..... 10.00 @ 11.00
Less list discount to the trade

Messrs. R. C. HOFFMAN & Co., Iron and Commission Merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of June 23: The demand for Iron continues active and prices very firm. We quote:

Baltimore Charcoal Wheel Iron..... \$26.00 @ 28.00
Virginia..... 27.00 @ 30.00
Anthracite No. 1..... 19.00 @ 20.00
No. 2..... 18.00 @ 19.00
No. 3..... 17.00 @ 18.00
Mottled and White..... 14.00 @ 15.00
Charcoal, C. B. Blooms..... 40.00 @ 51.00
Cut Billets..... 50.00 @ 55.00
Refined Blooms..... 45.00 @ 47.00

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of June 23: A fair business for the season is doing in Pig Iron, and the market is firm. Old Rails are in active demand.

American Scotch Pig Iron..... \$21.50 @ 22.50
Anthracite, No. 1..... 20.00 @ 21.00
No. 2..... 19.00 @ 20.00
No. 3..... 17.00 @ 18.00
Mottled..... 14.50 @ 15.50
No. 1..... 19.00 @ 20.00
No. 2..... 18.00 @ 19.00
No. 3..... 16.50 @ 17.50
Va. Cold-blast Charcoal, Cold-short..... 20.00 @ 21.00
Va. Neutral..... 17.00 @ 18.00
Va. Warm-blast..... 15.00 @ 16.00
Va. Red-short..... 17.00 @ 18.00
Old Rails..... 19.00 @ 20.00
Wrought Scrap No. 1..... 17.50 @ 19.00
Cast Scrap (machinery)..... 15.00 @ 16.00
Richmond Refined Bar Iron..... 28.00 @ 30.00
Horse Shoes per keg..... 4.00 @ 4.50
Mule..... 5.00 @ 5.50
Keg..... 2.25 @ 2.50
Freights to New York, \$1.50 per ton of 2400 lbs., by rail.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., June 9, 1879.

THE WHITSUNTIDE HOLIDAYS

have been very generally observed during the past week, so that there has been but a small amount of business done in the iron-making districts, in which Whitsuntide is regarded as the holiday of the year. In the North of England, Yorkshire and Lancashire, Whit week is most hilariously kept, and it is a somewhat curious commentary on the dullness of business, that this year there has been quite an average amount of junketing and pleasure seeking. Excursion trains have taken thousands from the crowded inland towns to places on the sea coast or to famous beauty spots of scenery in Derbyshire, the Lake District and elsewhere, and in every direction as much merriment (and, perhaps, dissipation) has been indulged in as during the heyday of trade. This is, no doubt, to a great extent excusable, and, perhaps, commendable; but it is a peculiarity of our working classes that they are willing to pinch, scrape and nearly starve for a certain number of weeks or months prior to Whitsuntide, in order that they may eat, drink, dress, travel and be merry for a few days then. The Sheffield grinder (always an apt illustration for writers on the idiosyncrasies of artisans) is of this order of architecture. He will have a splendid joint of the best that the butcher can sell him for his Sunday dinner, and will live like a prince for the first two days of the week. Toward Friday he will be in such straits that his wife will probably be compelled to resort to the pawnshop for the purpose of hypothecating the family Bible (or bellows) toward the means of sustenance for the time being. The weekly wages furnish redemption—and soon *da capo*. The Whitsuntide mania is of this type, but I confess my total inability to "point a moral or adorn a tale" therefrom. The worst part of our holidaying is that there is a great deal of drinking, although I think we have improved in that respect of late years.

THE STATE OF TRADE

is certainly very quiet, and it is rather doubtful whether some of our iron and steel producing centers have at any time had less work in actual course of execution. One hears of numerous inquiries and the placing of a variety of orders, but trustworthy reports from most parts of the country are convincing in respect of the slackness of the output. In raw materials and the results of first processes there certainly appears to be a moderate turn over, but as regards all classes of ordinary finished iron, the number of recent sales and their magnitude appear to be exceedingly limited. The fact seems to be that the foreign markets are all more or less disorganized, poverty stricken or over stocked, while the home trade—a most important factor in any calculations of this class—is dull beyond all precedent, owing to the unusual lateness of the season, the depression of agriculture, and the bank failures in Scotland, Wales, Cornwall, &c. We are exceedingly pleased and gratified to hear that the revival of trade in the United States is real and progressive, and it is further consoling to be told that there is a distinct change for the better in France, but these reports have so far added little or nothing to our material welfare. Our solitudes is, consequently, rather heightened than otherwise, for some of us begin to be afraid that the flood tide is apparently running outside the old channels, and is taking the argosies of commerce to shores other than our own. We feel, nevertheless, that there is nothing for us but the exercise of still more patience, and the due preparation for exerting all our energies when the sun of renewed prosperity does emerge from behind the dark clouds which still hide it from our expectant gaze. It is certain, at all events, that we shall most keenly watch and analyze the changes which are in course of evolution abroad and with you, and that there are those among us who are eager to seize the first opportunity that shall present itself for waging deadly war upon our present tariff, or rather no tariff, system.

EARL GRANVILLE,

who is, you may recollect, one of our largest ironmasters, being interested in the Lillieshall Works and two or three other concerns, was in Wolverhampton the other day in connection with the ceremony of unveiling a statue of W. C. P. Villiers, who has been (and is) forty-five years member for that borough, and who has been a staunch free trader all the time. Earl Granville being a graceful speaker and a genial man, besides being an eminent politician, was put up to reply for the House of Lords, and embraced the opportunity for discoursing on trade matters. As his Lordship's sources of information may possibly be superior to those of the "common herd," a portion of his speech will bear quotation. He said:

"In the United States, where depression began earlier and has been more severe than with us, not only trade is improved, but also that with this country is greatly increased. In Liverpool and Manchester more has been done in the last month than has been the case for a long period. In France, the prices for iron are hardening, but in the British iron trade there is no such improvement. Lower prices, and companies who stop payment without stopping work, seem the order of the day. There is, and there will be, a great displacement of capital and great individual suffering. Complaint is made not only of stagnation, but of foreign competition, foreign protective duties, and of the substitution of steel for iron. Have such complaints never been made before? My father gave me when I came of age an interest in the coal and iron trade. I cannot count on my fingers the number of times when prices have been high and when they have been low; but this I know, that on every occasion when they were inflated I was told there were reasons why they should never be very low again, and when they

were low it was mathematically proved to me that they could never rise again to their former height. As to general trade, it will, as it has always done before, find its own level. I am not afraid of foreign competition. No country, with, perhaps, the exception of the United States, has got the same natural and acquired advantages for metallurgical industries as we have, and as long as these countries choose, some to exhaust their finances and their populations by enormous standing armies, and others to tie the log of protective duties to their heels, I have no fear of the ultimate result. Following 1872 there has been in the world a decrease of the annual production of iron of 800,000 tons. What proportion of this reduction has happened in unprotected England? One-fifth. What proportion in the protected countries? Four-fifths. It is true that in the middle of this century we made exactly 50 per cent. of the iron produced in the world. Since then the whole quantity has been enormously increased; millions of money have been judiciously applied to the production of iron, still larger sums have been wasted upon the fictitious stimulus of protective duties. What is the extent to which our proportion of the make has been reduced? Is it 50 per cent.? 20 per cent.? 5 per cent.? No, it is 1½ per cent., and we are actually making now 48½ per cent. of all the iron in the world. The progress made in steel is a different thing; it does not affect the aggregate of the country, but it may widely affect the different districts. Mr. Thomas's invention is not yet a proved commercial success, but it is likely to be so. If so, it will be a decided advantage to that part of your country to which I belong—the northern division. With regard to South Staffordshire, Worcestershire and Shropshire, the means of meeting the difficulty will have to be very carefully considered. But among the most obvious means are the improvements and economies which, under the pressure of adversity, are now being so extensively applied to production."

These are "grave" words, my masters, but they have doubtless given a little comfort to the South Staffordshire people, who are beginning to feel a little out in the cold, since steel has come so prominently to the forefront.

THE RETAIL IRONMONGERS

and hardware men generally of this country, are forming themselves into an association for the purpose of bringing pressure to bear upon such wholesale houses or manufacturers as supply the public or the various co-operative societies. I am not quite sure how the project will work out in practice, but I notice that a beginning has been made, and that the two secretaries appointed at a preliminary meeting, recently held, write to their trade journal, the *Ironmonger*, soliciting the co-operation of the members of the trade. This to a great extent is aimed at

THE CO-OPERATIVE STORES,

which have hitherto continued to increase and multiply, in spite of the best efforts of the retailers. What is now proposed is that no ironmonger, hardware or metal dealer, &c., should deal with any manufacturer or other person who either supplies the stores or the public. The stove manufacturers are believed to be great offenders in this last respect, particularly in London. As a matter of fact, a builder, or any other person, can go into any one of a dozen stores and get a good discount off the price of a range, kitchener, &c., and so rob his ironmonger. The same state of things exists in other branches, and the retailers now declare that they will combine to stop the anomaly. One cannot blame them for so doing, as they have to carry stock, and lose interest on it and the cost of premises, and they ought to have the advantage, if any is likely to accrue. The dealers in agricultural implements have already a good association, and its annual reports mention numerous instances in which accounts have been closed with makers who have transgressed rules laid on lines similar to the foregoing.

A NATIONAL CONFERENCE OF IRONWORKERS has just concluded a three days' sitting at Manchester, the proceedings having been conducted *in camera*. A few details have been permitted to leak out, nevertheless, and from them I learn that there were delegates present from all the leading iron-making districts. The secretary, Mr. Trow, brought forward in the meeting a report, in which the depression of trade was attributed to overproduction. He also stated that steel had slowly, but surely, superseded iron in every branch, and that the prospects of the iron trade are most gloomy. As a means of relief for the suffering working classes who had been drawn from agricultural pursuits, and who cannot now find employment, an opinion was expressed that they ought "to live upon the land," and that there would be no permanent improvement until "the land is made to support its fair share of the people, and our manufacturing population considerably reduced." In the meantime, the committee recommended emigration to Texas.

SCOTCH PIG IRON

is again rather easier, although (as last week) the shipments compare very favorably with those for the same period of last year. It remains to be seen whether the operation of the German duties will check the export of pig iron to that country to any appreciable extent. There are now 268,519 tons in Connal's stores; on June 7, 1878, there were 175,807 tons. The number of Scotch furnaces blowing is 89, as before, and ballast pig remains at 40 per ton. Writing from Glasgow, on June 6, James Watson & Co. said: "The Scotch iron market has been irregular this week, the price having fluctuated between 42/41 and 42/40 per ton, closing this afternoon sellers at the last named figure, buyers one penny per ton less. The demand for makers' iron continues quiet, and prices are in several instances reduced. The shipments last week were 15,434 tons, as compared with 7362 tons for the corresponding week of 1878."

Two thousand miners have struck at Tamworth, England, against a reduction of their wages.

The Semi-Annual Meeting of the National Stove Association.

Proceedings of the Second Day's Session.

Boston, June 18, 1879.

President Rathbone called the meeting to order at 10 o'clock, and named the following gentlemen a committee to secure papers for the annual meeting: G. F. Filley, John S. Perry, Miles Pratt, W. H. Whitehead.

The next business in order was the report of the committee to prepare business, which was called for by the Chair:

Mr. Uriah Hill, Jr.: Mr. Chairman, the time was quite short in which to prepare matter for the meeting, and our entertaining ride of yesterday rather interrupted action. There was some difficulty in getting our committee together; the whole committee were unable to meet until this morning. The committee have not, therefore, prepared any written report, but they are unanimous in their opinion that we should recommend certain things upon which action should be taken by the association.

The general impression among most of the trade here is that some of our products have been sold too low, and the recommendation of the committee is that there be a general stiffening up of prices on such goods as have been sold too cheap. Perhaps we might say anything that has been sold less than 5 cents; perhaps that would be about the standard, with, of course, an addition for all extra mountings and trimmings, and extra expenses.

Again, they would recommend something in the matter of credit; that really is a part of the price of our commodities, and while for coal, iron, screws and every little item entering into the manufacture of our goods we are held strictly to cash, or a limited term of credit—a fixed term of credit—and that quite restricted, it would seem that we ought to think enough of our products to have a limit prescribed for them, that we may not give, as it were, an unlimited credit. I suppose every individual here in the purchase of his coal finds out that it is cash. If they have to buy iron, again it is cash, or a limited term, with interest added; and labor, of course, is cash every settling day, so that it will be readily perceived that everything that enters into the production of our goods is cash, or very near it, and we should be very careful to whom we extend unlimited terms of credit. It is thought that four months should be the limit of credit on all bills.

This being the summer meeting, the committee thought there was nothing further to recommend as business before this meeting, this being the most important topic for consideration, because we are now upon the edge, as it were—"the ragged edge"—of the business for the coming season. During the coming six or eight weeks every man who finds that he is uncomfortably loaded up with goods will be offering inducements, very likely, to get rid of his goods. I apprehend if he could know all that was to come he would be more careful in his contemplated action.

I only throw out these hints that each may be on his guard, and take the precaution not to sell goods as low as has hitherto been the case; I mean now some of the lower grades of goods—ranges and coals. You will all recall that last fall prices took quite a tumble; they were not remunerative. Many of our goods were quite profitable. At the January meeting, at Rochester, our friends had not gone over their accounts for the year to ascertain where they stood, and consequently there was no action had at that time as to prices, but very soon after the adjournment of the winter session it became evident to every careful manufacturer that he had been selling many of his goods too low. Some of our friends, more alive to this than some others, took the initiative of issuing circulars and sending out letters and calling the attention of certain localities to the subject. I think that the trade generally owe a debt of gratitude to those friends who, at the sacrifice of time, health and money, went around and interested themselves in this matter, and awakened thereby a pretty general attention to the fact. I think it has saved thousands of dollars to the trade generally.

In this recommendation, of course, the committee are unanimous, and they make the recommendation also in the hope and belief that those who are to take our products and dispose of them will readily see that they are not burdened. There is no combination; there is no exorbitant price put upon these goods. It is simply what we need to keep alive a fair manufacture of goods; so that we can make good goods, and put them in proper shape upon the market—the goods well made and placed in the retailer's hands. As the old adage runs—"Goods well made are half sold." Goods well made and put upon the market in good shape are half sold, and the trade will quickly see, I think—they are intelligent people—the necessity of good manufacturers having a fair remuneration for the capital invested in foundries, patterns, iron, labor and all those things, and that they want a fair remuneration for it, and that they will be willing to give it. It is a very small matter. For instance, a stove of 200 pounds—I will illustrate in brief, and then I shall leave to the members of the association the care of this matter and enlargement upon it, and I hope we shall hear from very many of those present, as all are interested in the matter, and it is a matter that we may all have a thought upon or a word to express that shall be of general benefit to the whole association. As I say, take a stove weighing 200 pounds, and suppose the price on this is squeezed down and we sell it for 4½ cents a pound, there is \$9 for the stove. Now, suppose we make that stove, as the committee recommend, at 5 cents a pound; that is \$10. It is a very slight advance to the consumer. It is a very slight advance to the retailer. It is a very slight advance, as you see, to the manufacturer, and yet on the thousands and tens of thousands of stoves that are made it is quite an item, and the manufac-

turer will realize in his balance sheet at the close of the year whether he receives the apparently slight advance or whether he throws it away.

Unanimous. I repeat, are the committee in recommending these suggestions to the association, and I trust members here present will take up the matter, and give it such discussion and consideration as its importance to the trade seems to demand and urge.

Mr. John S. Perry: Mr. President and gentlemen of the Association, I have ever felt a deep interest in the prosperity of this association. I believe it contains within itself great power for the good of the trade.

The cultivation of friendship by social intercourse is a strong element in itself. Upon a falling or a stationary market the power and influence of this association is, perhaps, not felt in a marked degree; but upon a rising market its power may be made pre-eminent. That we are to have a rising market at no distant day cannot be doubted. The sound financial condition of the country, the abundant crops in the past, and in prospect for the future, the large volume of immigration and the reduced amount of manufacture in our trade, all point to this result.

It has been frequently shown that a fair assortment of stoves, under average circumstances, cannot be made, at the present cost for material and labor, and sold and the proceeds collected, under five cents per pound. And I make this statement after an experience of thirty-six years, and a great deal of attention given to that particular branch of the subject.

This statement yet remains uncontradicted. If there is any experienced manufacturer present who has the figures based upon exact statement, who can show a more favorable result, I respectfully call upon him to make it known now and here. I say experienced manufacturer. I place little value upon the opinions of theorists—men new to the business, who appear to think that the material and labor comprises the whole cost of stoves, with, perhaps, a small amount added for extras, as estimated. It is this estimated amount that makes all the trouble.

In 1843, when I commenced manufacturing stoves (and myself and many other gentlemen present, were engaged in the business at that time), a profit was realized at 2½ cents, with iron at \$25. At the present time, with iron at \$18, I believe there is ordinarily no profit at 5 cents a pound.

How is it possible that manufacturers can go on from year to year selling their products at 3 cents to 5 cents? That it is not possible to continue this without loss, is shown by our depleted ranks, and this process of depletion I fear will continue, unless a radical change takes place in the present manner of conducting the business. We all desire to get good prices, but as we are too much afraid of each other we fail to realize them.

Let us try to bring ourselves to believe that stoves really have some value, and to make an effort to obtain something at least approximate to their cost. (Applause.)

The President: I trust there will be a very general expression of opinion in reference to this matter. It is a matter of the very highest importance to the trade. In order to bring the matter properly before the association, what is your pleasure with reference to the report?

Mr. W. H. Tefft: I move it be accepted. (Carried.)

Mr. Geo. H. Phillips: I would ask what constitutes the difference? Mr. Perry says that in 1843 he made a profit at 2½ cents, while now it requires 5 to make it up. Then iron was \$25, and now but \$18. Why this difference?

Mr. John S. Perry: In 1843 molding cost \$8 per ton; it now costs \$11 to \$20. I remember very well that one man by the name of John Harrigan, whom very many of you remember, with but a single man to help him—a German, not a mechanic—to whom he paid 6 shillings a day, with simply a hammer in the hand of each, would mount more stoves in one day than could be put upon this floor. There was not a door to be drilled; there were no latches, except what were cast; there was no filing; never was a file put to a plate. They were simply hammered together. At that time there was very little cost for selling goods. We had no travelers, which, you all know, is a very expensive affair. The cost for patterns was very trifling. When a firm had a set of patterns, they were considered of value; of what value now is a set of patterns, however expensive, as capital? They are good for this year, or next, and perhaps the succeeding year, but soon they are of no value at all, until they have been entirely remodeled. At that date we expended perhaps \$2000 or \$3000 a year in patterns and flasks. Now there are firms that expend \$40,000. And so I might go through the entire list, if I had it in my hand to refer to, and it is a very long list, to show wherein this difference is. The iron, the molding and the mounting is but a small portion of the cost of manufacturing stoves. I state, and state it holding myself responsible for it, that any concern that carries on business for five years, taking one year with another, and taking all the losses and all the expenses, and all the stealings—that with iron at \$18 a ton, and labor at the present prices, stoves will cost 5 cents a pound. Of course, if the patterns are bought, well and good; and if there are no ground edges and very little nickel work, there will be a trifling difference; but they are sold at less prices. One takes care of the other; if the stove costs less, it is worth less and sells for less. You put a nickel panel on the door which costs you 50 cents, but you can get, possibly, a dollar more for the stove.

There is one item in the cost of stoves that I have observed very few count upon. In fact, there are very few items taken into account; but one there is that certainly is not shown upon the books, and those who have not kept the records would, I think, be very much astounded to learn the cost at the end of the year. I refer to the cost of discarded plates; that is, that have been bought and paid for and discarded from the racks, or broken in mounting, or damaged

in the many various ways. We keep a daily record, and therefore know what it amounts to. It is something tremendous. What concern is there, doing a business of 2000 or 3000 or 4000 tons, that does not throw out, at the end of the year, 50 tons of plates that have become obsolete, or some improvement has been made, and it is thought cheaper to throw them out than to mount them in the stove, on account of improvement or mistakes? Now, if you made 4000 tons of castings last year, and have taken up the cost from your books—for there is no other way that I know of to find out the cost of stoves, except, in the first place, to take your inventory of last year—take each item and place it under its appropriate head, and then go through and take the items of money you have actually paid, or agreed to pay, and add to the goods that are inventoried, and then deduct at the end of the year the goods that you have inventoried at that time, and the balance is the cost. Take the item of molding. Many people, to ascertain the cost of molding, figure up each plate—what they are paying their men—and say that is the cost of molding. But it is not the cost of molding at all. In my opinion, it is not within \$2 a ton the cost of molding—that is, taking the thing through the year. Take the occasion where some accident occurs, and you do not run off more than half of the "heat," and are obliged to allow your molders for the work lost, and the prices allowed the molders by the foreman, which, perhaps, you never hear of on the books.

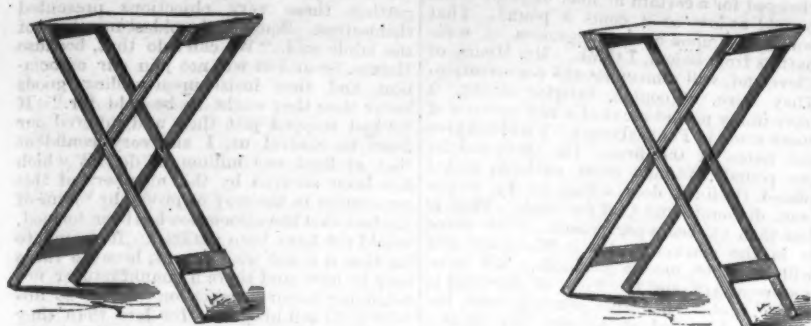
There are a great many ways in which molding costs much additional to what appears upon the surface. Go through, then, all the various items in that way, and if you have made 4000 tons of castings, and it has cost you \$80,000, it is very clear that the molding has cost you \$20 a ton, whatever the account books of the men may show from day to day; and that is a thing that cannot be gainsaid, viz., if you have paid \$80,000 and cast 4000 tons, it has cost you \$20 a ton. If everything is taken up in that way, I think it will be found that the cost is more than we calculate if we calculate merely by estimate. If you have found at the end of the year that your castings have cost you \$100 a ton, for example, and during the succeeding year you find tons of castings in your rack that are obsolete and undesirable, and you put them into the scrap, and they are worth for iron a cent a pound, if you please, I say there is a dead loss, so far as your books show, of \$80 a ton, and if you have thrown out 50 tons, there is a loss of \$4000.

I call upon any gentleman present to show that this is not true. It is an item that does not come in and is not shown on the books at all. It is, nevertheless, a loss. In most establishments, too, there is a large item of stealings that also does not appear on the books, and is no insignificant item to those who have watched it. I regret I have not the entire list to refer to; had I, I could go through, in detail, and show the association, I think, the reasons why stoves with iron at \$18 cost \$100 a ton, while in 1843, with iron at \$25, they could be sold at a profit of 2½ cents.

Mr. Grange Sard, Jr.: Mr. President, the subject we are now discussing appears to me, as it must to all, to be of the greatest importance. I think one of the reasons why stoves have been sold so low has been because there was such a variety of opinion as to what it cost to make stoves. The more fully that subject can be discussed, the more intelligent will the action of this association be. I regret that that branch of this subject has not often been discussed in these meetings. About a year since there appeared in *The Metal Worker* a discussion of this very subject, in which very careful analyses of cost were made, and I was very much interested in reading them, and regret the subject has not been still further elaborated. There were some very startling statements made in those issues to the effect that below 5 cents a pound there was no profit to the manufacturer. I regret that some of those parties in our trade who are in the habit of selling goods at less than that price, and who claim they can afford to do so—I regret, I say, that those gentlemen did not answer those statements, and prove to those who are not so fortunate that they were mistaken—that their stoves did not cost so much as it was supposed. It is a very difficult problem to determine what the cost of any particular stove is, and I have rarely sat down to discuss the subject with anyone and found that our minds fully harmonized, and I fancy there may be almost as many different views as there are individuals. There is one thing we do find out, and it is, that after making our stoves as cheap as we can, and after practicing the most rigid economy in every branch of our business, we find at the end of the year we have not made any money, or perhaps a trifling amount, or perhaps lost money. I do not think there can be any question when we have reached the end of the year that the reason why we do not make any money is because we sell our goods too cheap. We may run so large a business, and be never so enterprising in our patterns, and in the manner of doing business and making sales, but except we get more for our goods than the cost to make and sell them, the only and inevitable result that can follow is loss.

So we are brought face to face with this question. If we do not get more for our goods than we obtained last year, we must lose a great deal of money, because it costs more to make goods this year than last year. There are various items of cost which are very decidedly more, and I would refer to one item at this time as being very much more expensive than last year, and I allude now to the nickeling. Since the decision of Judge Blatchford in the matter of the suit of the United Nickel Company, all of us are under tribute to that company, and some manufacturers here will be obliged to pay that company for the year upon which we are now entering, as royalties for the use of the nickel-plating solutions, a great deal of money. Various other materials are costing more. We are elaborating our stoves to a degree that is most remarkable. We are drifting into more and more expensive ways of doing business. Our account for advertising and printing, and everything of that kind, is liable to

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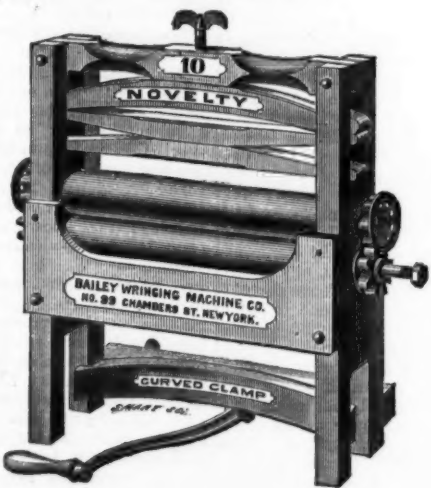
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increase, and we must add these things to our prices, otherwise we must lose money.

I do not believe that any basis can be agreed upon that shall be arbitrary as to prices; 5 cents a pound may be cheap for some stoves. I do not think it can be dear for any. It is certainly cheap for many. There are some that are a loss at 6 cents a pound, while others are profitable at 5 cents. This subject, it seems to me, is one upon which we cannot very intelligently legislate, but it is a subject that appeals to the good sense of every merchant, and especially does it come with force to those who are desirous of doing business in a conservative manner, and to preserve intact the capital they have made in years past, and that their name may not be dishonored.

I trust this subject may receive a very full discussion, and be not only discussed here, but acted upon before we leave this meeting, for it is a vital subject, requiring the influence and co-operation and earnest action of every member of this association.

Mr. James S. Spear: Mr. President, I do not manufacture stoves, and consequently it does not affect me so much. There are a great many large manufacturers here, and I should be glad to hear from them on one point, and that is, How many bad debts they have made during the last year? (Laughter.) How much money they have lost? Whether their losses don't come in as much in bad debts as in the cost of making stoves? That's where it affects me. When I send out a traveler and sell on 30 days the trade say: "Oh, we can buy on 4 months, and have it renewed for 4 months more, and if we can't pay in that time we can have the paper renewed for 4 months more." Well, now, you can all tell what time that is; that's just 12 months. And when I look over the list furnished by the various commercial agencies, I find Fuller, Warren & Co., on a claim where a man has failed to the amount of \$30,000 or \$40,000, in for \$2000 or \$3000. I find S. H. Ransom & Co. in the same situation, likewise Rathbone, Sard & Co., and so I find quite a number. Now, I would like to ascertain their total loss for the year in bad debts; whether a good deal cannot be saved by being more careful as to whom they sell, and whether they can't sell on less time than 4 months, and renew it for 4 months longer.

I can sell on 30 days' time, and I can get my money, but I get "stuck" frequently by trusting some of these men who are buying on 4 months. I get stuck on the very man who buys on the 1st of January and can buy of the Troy and Albany men—that's the man I lose my money on. If some of these gentlemen can tell how much they lost, it would be very satisfactory to me. (Laughter.) I might add that I settled with a man in Massachusetts who had bought some open Franklin stoves from me on cash at 30 days. His excuse for failure to meet his obligation was that he hadn't sold them, and that the weather was warm! He asked for 30 days longer, which I granted him, and at the end of that extension he said he would be unable to settle until the 1st of January. The 1st of January I drew on him, and my draft came back unpaid, and he said he could not pay, and would be obliged to call a meeting of his creditors. I paid no attention to that. I threw his letter on the desk, and never answered it. On my birthday, the 17th of February, I received a telegram from him at Jersey City that he would be over to see me. He did come over, and I waited at the store till 4 o'clock, when he came in. I was very sorry indeed to know what his troubles were. I asked him these questions: "What is the difficulty? What trouble have you got into?" "I indorsed a note," he said. Then I asked him: "How long have you been in business?" "Eleven years," he said. "What amount of goods did you sell during that time?" "From \$25,000 to \$30,000 a year." "What family have you?" "Myself, wife and one child." "What rent do you pay?" "I pay \$1100 for my store." "What are your family expenses?" "About \$1100." Come to figure it up he ought to have had \$15,000 or \$16,000 laid up. "Then what is the trouble?" "I indorsed for a brother-in-law \$4000 or \$5000." "Did you pay?" "No." "Well, sir, I am very sorry for you." We talked along until it was time for him to go home. I said nothing about compromise. Finally I pulled out my watch, saying, "Are you going to remain in Philadelphia all night?" "No," he replied, "I am going on the half past 6 o'clock train." "Then," said I, "you have just half an hour to get the train. I must go home."

Next day I sent to my attorney to investigate his case, for I thought it was a swindle. A letter came back from the corresponding attorney, saying that he had been down to the debtor's place and he did not think he could pay 10 cents on the dollar. He had already offered me 15. He said Fuller, Warren & Co. had settled at 15 cents on the dollar; that he owed them \$700. My bill was \$132. I thought over it a little while. I said: "You are his attorney; I have got hold of the wrong attorney." So I wrote back, "If you will send me a draft on New York for \$100 I will settle the matter, and in no other way; and he is to pay your expenses into the bargain." The next mail brought me \$100. The rest had settled at 15 cents on the dollar (Laughter).

Mr. Grange Sard, Jr.: I would like to ask, if it is in order, whether the proceedings can be interrupted sufficiently to propose membership; if so, I wish to propose the Smith & Anthony Stove Company. They may very likely wish to take part in the meeting through their representative. I move they be accepted as members. (Carried.)

Mr. Uriah Hill, Jr.: Right here, Mr. President, I would like to make a suggestion. There are a great many good concerns in the country that are not members of this association. I think it would be to their interest to become such. I also think it would be to the interest of the association to have them become such. Just how we shall go to work to interest them in it, I know not and cannot suggest. Our President has quite enough, perhaps, on his shoulders. Perhaps the same may be truthfully said of our Secretary. Just how we shall reach these concerns and interest them in the matter, I can't say. I leave that to some one else. I think it is of great consequence that all the manufacturers of the country should become members of our association. It is all very fine for us to take the initiative in

all these matters and be at the trouble and expense, and while we "shake the bush," they stand by and catch the bird. That is all very well, but we want their counsel and advice, and we want them to understand these matters as we understand them. If they are members, and meet with us to discuss such matters, they are fully prepared to go home and carry out the measures that are here agreed upon for the general interest. As was remarked a few moments ago, we do not expect to bind any body by lock and key to carry out to the fraction everything that may be suggested here. As sensible men, when these matters are thrown out that are of interest, it would seem to follow that we could all take them up, act upon them, and profit by them.

Our friend from Philadelphia (Mr. Spear) has made a suggestion that interests us all very much, as to how we give credit and how long. I think this matter of fully as much importance as what we get for our goods. It does not matter whether we get 5 or 10 cents for our goods if we put them in parties' hands who will only pay us 15 cents on the dollar for them, or perhaps nothing, at the end.

But I have somewhat wandered from the subject I proposed to bring before the association, and that is that all in the trade should be solicited in some way to become members. Before I sit down I will add this: perhaps a letter from our Secretary to the different firms would have the desired effect. I do not know but they are all on his record and can be reached; or perhaps members will interest themselves in it. I certainly will endeavor, if there are any parties in our locality not now members, to send their names to the Secretary, in order that they may be invited.

The President: Will Mr. Hill allow that matter to rest until we shall have disposed of the recommendation of the committee?

Mr. I. A. Sheppard: May I ask the Secretary to read the recommendation, if he has it?

The President: There is no motion before the house. I think it would be well if some gentleman would make such a motion.

Mr. I. A. Sheppard: Mr. Chairman, I read an anecdote once of a celebrated colored preacher in the South coming down to preach to the darkies, and one of the planters spoke to him beforehand and said that he wished he would preach them a strong, rattling sermon against stealing; he thought that was the great and prevailing sin there. The colored brother pondered a moment and finally said, "Well, boss, I'd like to 'com' date you, but I think if I struck 'em dar, it would throw a terrible coldness over de meetin'." And so when brother Spear struck on the point he did, I was afraid "it would throw a terrible coldness over de meetin'." (Laughter.) I think, perhaps, there are none of us here, or any firm represented in the association, but he has been doing that very thing that he has been speaking against, to a very damaging extent. It does seem to me, and it has for years seemed to me, to be one of the greatest evils in the trade—the prodigality with which credits have been extended. Mr. Perry has given certain figures, based upon his experience, in regard to the cost of manufacturing stoves. Others have taken up that subject. However we may have differed in our experiences in regard to the cost consequent upon the various styles and weight of patterns in different localities, I think that if we will just sum it all up, take the facts as they stand before us—the experience of the last two or three years—that we can all agree upon the one point, at all events, that we have not made any money. And if we have not made any money, how are we to make it in the future? Some may say: "By increased business." How are we going to increase the business? Competition is perhaps as sharp in this branch of trade as in any other branch of business in the country. People are not going to buy stoves as a matter or ornament or as a matter of fancy. It is an article of utility, and will be only purchased when it is needed. There is not the same chance, I think, in this business to create a demand that there is in many other branches of trade; hence I do not see where we are to get the increased demand or the enlarged market. Then, if that be true, and we have made no money in the last two or three years at the prices at which we have been selling, and while admitting that we have profited, as I think we all have to some extent, by our experience in giving credits—for Mr. Spear, and Fuller, Warren & Co., and other gentlemen are not alone, I guess, in that regard as to losses on their bills—I do not think there is one among us here that would like to say: "I have made none," and throw a stone at the others; and if that be true, and there is no enlarged market by which our trade is to be increased, if we are narrowed down to about the same localities and requirements of the parties, how are we to make any money without getting more advance upon the price of our productions? There are none here who will pretend they can manufacture goods any cheaper this year than last. In fact they can't manufacture as cheaply. Mr. Perry has named \$18 as the price of the iron. That figure, in my judgment, take the average of the year, unless gentlemen have got their stocks bought for the year's supply, I think is too low. Take it at \$18; if I buy iron and deliver it at the nearest railroad station to the foundry at \$18, that is not the cost of the iron. It has to be hauled into the yard. It has to be handled, and it costs something. There are many making stoves to day who can't get their iron at \$18. I say I think that figure is low. I see no other way to make a profit out of the business but to get some advance in prices. I am very free to say, and I have no doubt Mr. Perry will admit at once, or any other gentleman who has taken that calculation of cost, that if he (Mr. Perry) or any other gentleman will take his foundry and fill it full—put in a set of patterns on the 1st of January and run it until the 30th of December, and send off his goods and get his money every month, and turn it around, he could produce stoves at a great deal less than 5 cents a pound.

Mr. John S. Perry: That's not the way it is done.

Mr. I. A. Sheppard: No, that is not the

way it is done. But the incidental expenses connected with the business must be placed somewhere, and it is a very large amount. There are certain expenses, as we all know, incidental to the business. If you run your foundry only nine or ten months, there are certain incidental expenses connected with it that you cannot get rid of. If you have capacity for 100 molders and lie idle two months and run ten, and instead of running 100 you run 50 or 60 molders, your proportionate expense of making the goods is considerably more than if you were running the 100 molders. Take it as it is, and as we find it, it seems to me, throwing theories on one side and taking the experience of the past, that we must endeavor to get some advance upon the goods we manufacture for the coming year, if we are to derive any profit or pay for our labor in conducting business.

Mr. Jas. S. Spear: And less losses.

Mr. I. A. Sheppard: Well, I'm with you all the while on that. Last September I issued a circular making a sliding scale of discounts, making it 10 per cent. off for cash on the receipt of the goods; 5 per cent. off if paid when the statement was rendered at 30 days; 4 per cent. off at 90 days, and no credit beyond 4 months. It is the best move I ever made since I have been in business; it has paid me better than any circular I ever put out.

Mr. John S. Perry: It seems to me that the condition of the trade is very much as it was in 1872 when this association was formed. It has one advantage, and that is the members of the trade are upon more friendly terms with each other, and they are better acquainted with one another than they were at that time. We have not, perhaps, advanced quite so far in the increase of prices, or the general advance in goods, as at that time. But then there was an upward tendency. There is an upward tendency now. That is the universal opinion. You are all aware what benefits resulted from the association at that time, during the early years. And why they were not continued was because the prices were falling rather than advancing. Now, we are very much in the condition that we were at that time, and I do feel very strongly that now is the time for the association to make a strenuous, systematic effort in getting the trade into its membership, and insisting upon advanced prices.

We, of course, cannot lay down any arbitrary prices that we will not sell below. That is impossible. But I think this association should pass a resolution recommending that no stoves be sold at less than 5 cents a pound for the castings, and with the cost of the mountings, the rods, the screws, the knobs, the nickel plates and the various other things added, and 25 per cent. added to such cost. Although we may not always be able to get it, yet if we pass such a resolution and make the effort, it will be paving the way to something better next year. I move that as a resolution.

The President: Will Mr. Perry reduce it to writing?

Mr. John S. Perry: I move that it be the sense of this meeting that it be recommended to the trade that no stoves be sold under 5 cents a pound for the castings, with the cost of the extras added, and that 25 per cent. be added to the cost of material.

The Secretary put the resolution in form as follows:

It is the sense of this meeting that it be recommended to the trade that no stoves be sold under 5 cents per pound for the castings, with the cost of the extras added, and that 25 per cent. be added to the cost of material.

The President: Is that your motion?

Mr. John S. Perry: Yes. Perhaps it

would not be advisable to have it printed at

25 per cent. advance, but that is my idea. The

cost of extras to be added, with a reasonable

profit, I will say.

The resolution being seconded,

Mr. William H. Tefft said: Before that

resolution is put, Mr. President, I would like

to say, in regard to the recommendation

which was made as to prices, that in the

West, during the past winter, it seems to

have worked very well. I think there is a

general feeling in the West to adhere to

those prices as near as may be, and those

prices were a little at variance with that

resolution. There are some leading stoves

that were compromised out in Chicago and

that section on a basis of a little less than

5 cents, and whatever the resolution may be,

I think they will be sold at that. But if that

resolution could be adopted and adhered to,

I for one should be very glad to support it.

A basis of 5 cents a pound is full low enough

to sell any kind of stoves at, and from that

up. There are very few stoves except very

common box stoves, or something of that

kind, that are not known down this way.

that are sold below those prices.

Col. W. P. Warren: Mr. President, I hold

in my hand a resolution that I had written

previous to that just offered by Mr. Perry,

and with all due deference to his resolution,

I must suggest it strikes me as a little arbitrary.

Our mission is rather to recommend than

to dictate.

Mr. John S. Perry: Excuse me, my motion

was merely recommending.

The Secretary, by request, again read Mr.

Perry's resolution.

Col. W. P. Warren: I accept the amend-

ment proposed. There is another fact that

enters into this case just at this time of the

year, Mr. President, and that is the price of

heating stoves, or those commonly known as

"base-burning" stoves, and I did hope to

hear something said upon that point. It oc-

curs to me that 5 cents a pound is entirely

too low to put upon them as a minimum

price, with extras added.

Mr. John S. Perry: I intended the motion

to refer to the cheapest class of stoves. No

one, of course, will think of selling base-

burners at 5 cents a pound. Perhaps it

would be well enough to say "5 cents and

upward."

Mr. George H. Barbour: One thing, Mr.

President, has been lost sight of, I think.

At the meeting at Cleveland it was referred

to. Some manufacturers in Ohio had some

inferior patterns—patterns that they were

running right along in the sand—that

they wanted to sell below 5 cents a

pound, and we agreed at that meeting that those patterns that had not been changed for a certain number of years could be sold as low as 4 cents a pound. That was agreed upon at the suggestion of some parties from Salem, I think. Mr. Myers, of Cleveland, will remember the conversation. They were, of course, inferior stoves. I have in my pocket a cut of a new pattern of stove made in Pennsylvania. I will not give the name of the firm. The stove weighs 200 pounds, 18-inch oven, modern, nickel plated, tin-lined door, selling at \$9, 20 per cent. discount, and 5 off for cash. That is less than 3½ cents per pound. That stove is in the market to-day in Michigan, and will, no doubt, meet a good sale. We have a stove at \$17, and the basis of discount is 10 per cent. The same stove is sold for \$13.50 and landed at Kansas City, or any part of the West. There is another leading concern that is furnishing good stoves, nickel-plated and modern style, that are fully 5 cents a pound. They don't belong to this association, and I wish something could be brought to bear to bring them into the association; but I do not think they can be brought into it. Now, they propose to sell those stoves and secure the trade if they can, and they are meeting with very good success. They readily sell their stoves at \$19 to \$20 if they can't get more. That makes the basis of 5 cents a pound very unpopular in some sections.

We do not propose to sell below 5 cents a pound, and we intend to get more for our goods if we can, as we have never been considered a house that favored low prices. At the same time, these things come in and make it very unpleasant, to say the least.

Mr. Jas. S. Spear: How many manufacturers are making that kind of stove—the one that is sold so cheap?

Mr. G. H. Barbour: I have only heard of one. That's sufficient.

Mr. Jas. S. Spear: Can't you let him go on?

Mr. G. H. Barbour: We shall have to.

Mr. Jas. S. Spear: I will tell you my experience, as I seem to be considered as having been quite successful in business. I started in business in 1856. I took account of stock on the 1st of February, after being in business for seven months. I found I had made \$3000. I went on, thinking I had done a very good thing, because I had just stepped out of a salary of \$1000, and here I had made \$3000 in about eight months—from the 16th of July to the 1st of February. I was very much elated. I was going to do still better the next year. At the end of the year I took stock once more, and to my utter surprise I had lost \$800 and my year's labor. It was during the panic of 1857, and the Life and Trust Co. of Cincinnati had gone up, the Bank of Pennsylvania had failed, and everything "gone to pot" at that time, and I was left with a good deal of stock on hand and could not pay my bills. Most of them were parlor stoves. I had virtually failed. Mr. Ransom will probably recollect it. I had bought of him stock to the amount of perhaps a couple of hundred stoves, and I was virtually a broken merchant. I went to North, Chase & North, and said to them, "I can't pay you."

"What can you do?" "I can give you the stock I have on hand."

"We don't want that."

"I said to McDowell, to whom I owed

\$500, that I could not pay, but would give

up the goods. No, they didn't want them.

"Well, Jummie, what can you do?" "I will

do the best I can for you."

"Well, do so."

I sent word to Ransom that I couldn't pay

him. He wanted to know when I could pay.

I said next November I could pay him. He

sent me a note to sign, which I did, and I

paid him on the 1st of October, dollar for

dollar, with interest. I took account of

stock, and found I was selling the old three-

step stove called the "Complete" for

\$12.50 that cost \$10.50, 10 per cent. off. I

figured up on that stove what it cost to

put the wash-boiler on, the tea kettle, pot-

covers, &c., &c., and I found it had cost me

\$15, and I had been selling it for \$12.50. The

whole trade was selling at the same. I had

sold 350 of these stoves. I went on to figure

up on my stove pipe, bricks, grates and odd

sets, and I made a profit on all of them.

On the parlor stove, sold at \$16, we made a

dollar. On the cook I concluded I had lost

my money. The next day the price of that

stove was \$16. Our trade was principally

Irish trade. They would ask the price.

"Sixteen dollars." "Oh, now, come, come,

we can get that stove below here at \$12.50."

An American lady would come in and ask:

"What's the price of that stove?" "Six-

teen dollars." "Is that the very best you

can do?" "Well, as you are an old customer,

we will let it go for what it cost us—\$15."

That year I sold 75 stoves; the next year,

50; the next, 25; and the next year the

stove was out, and I never sold another one.

I had the backbone to stand up against all

the trade on the street, and put that stove

up at \$16 against \$12.50. That is what

gentlemen here to-day need—a stiffening

of backbone to what they recommend.

All around me have failed. Not a single

man on the street but has failed, except

John S. Clarke, and Mr. Sheppard can tes-

tify to that fact. Every one of them has

failed since 1857 on that cheap basis of

prices.

Mr. Grange Sard, Jr.: It seems to me we

have not acted on the resolution that has

been seconded.

The President: Mr. Perry's resolution

was seconded. Do you offer anything as an

amendment?

Mr. Grange Sard, Jr.: I offer the follow-

ing:

Resolved, That it is the sense of this meeting

that, unless stoves of the lowest grades are

sold above 5 cents per pound, with an addi-

tional charge for all extras such as nickel, mica,

reservoir, &c., there can be no profit to the man-

ufacturer.

I don't know but what Mr. Perry's resolu-

tion, if it is amended by adding "of the

lowest grades," or something of that

kind, will cover the point the same as this

does.

The Secretary again read Mr. Perry's

resolution, and Mr. Sard moved to amend

by inserting "stoves of the lowest grade,"

which amendment was accepted by Mr.

Perry.

The President

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Clark Wm., 750, 1st St., N. Y.	1
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Fardoe, A. & Co., 111 Broadway, N. Y.	1
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John Russell Cutlery Co., 99 Chambers, N. Y.	1
Mart Bros., 45 Broome, N. Y.	1
Meriden Cutlery Co., 49 Chambers, N. Y.	1
Nauvau Cutlery Co., 49 Chambers, N. Y.	1
Rogers Cutlery Co., Hartford, Conn.	1
The Lamson & Goodnow Mfg. Co., 88 Chambers, N. Y.	1
Differential.	
Yale Lock Mfg. Co., 41 Chambers, N. Y.	1
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Haigh John, 1st St., N. Y.	1
Discount Tables.	
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Leigh Edw. B., 108 E. 14th, N. Y.	1
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Dunne P. R., 1st St., N. Y.	1
Van Wagoner & Williams, 25 Beekman, N. Y.	1
Door Bolts.	
Ives Hobart B., Fair Haven, Ct.	1
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Thorne, De Haven & Co., Philadelphia.	1
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Baldwin Locomotive Works, Philadelphia, Pa.	1
Engines, Steam.	
Ervin Chas. W. & Co., Kensington, Phila.	1
Pittsburgh Steam Engine Co., Pittsburgh, Pa.	1
Harris Wm. A., Providence, R. I.	1
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Lane Bros., Millbrook, N. Y.	23
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Cleveland Wrought Iron Fence Works, Cleveland, Ohio.	7
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Fisher Joseph S., 41 Commerce, Phila.	30
Moss F. W. & John, N. Y.	30
Files, Manufacturers of.	
Albion File Works, 38 Chambers, N. Y.	30
Barnett G. & H., 41 and 43 Richmond, Phila.	30
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Draper C. T. & Co., Sing Sing, N. Y.	30
Everhart James M., Scranton, Pa.	30
Johnson & Bro., 1 Commercial, Newark, N. J.	30
McCaffrey & Bro., 173 and 174 N. 4th, Phila.	30
New American File Co., Pawtucket, R. I.	30
Nicholson File Co., Providence, R. I.	30
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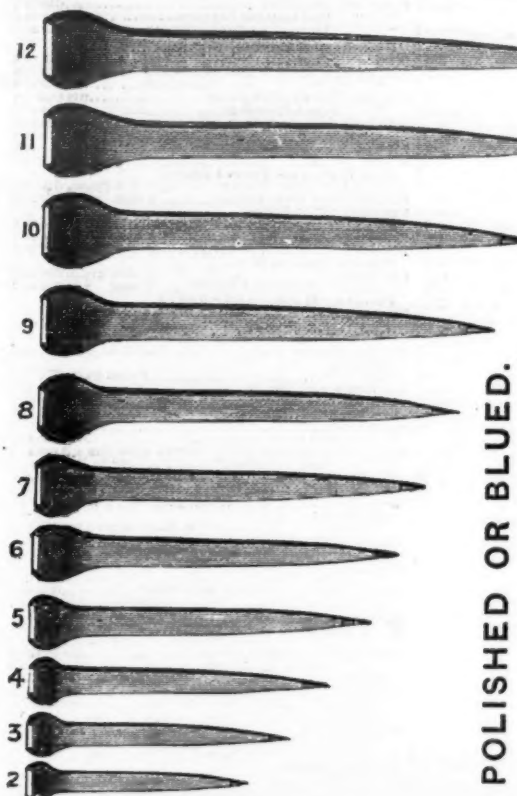
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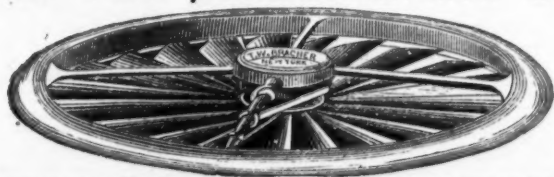
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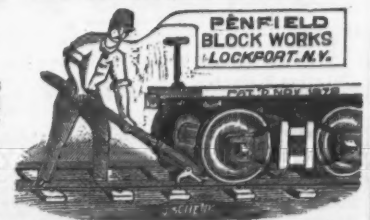
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AMERICAN SCREW CO.,

Providence, R. I.,

MANUFACTURERS OF MORE THAN 4000 VARIETIES OF PRODUCT,

AND INCREASING THE ASSORTMENT DAILY.

Machinery employed contains important inventions recently patented, and which are designed to produce Screws at a **lower cost to the consumer** than has ever been attained.

All goods are distributed through the Hardware trade, to whom a liberal discount will be allowed.

INTERNATIONAL EXHIBITION.

No. 235.)

PHILADELPHIA, 1876.

The United States Centennial Commission has examined the report of the Judges, and accepted the following reasons and decreed an award in conformity therewith.

PHILADELPHIA, November 8, 1876.

REPORT ON AWARDS.

Product: Iron, Brass and Steel Screws, Tire and Stove Bolts, Rivets.

Name and address of Exhibitor: American Screw Company, Providence, R. I.

The undersigned having examined the product herein described, respectfully recommends the same to the United States Centennial Commission for Award, for the following reasons, viz: **Being of a quality nearly approaching perfection, showing the highest attainment in this branch of manufacture.**

G. L. REED, Signature of the Judge.

Approval of Group Judges.

Daniel Steinmetz,
Jas. Bain,
Chas. Staples,

G. L. Reed,
J. D. Imboden,

J. Dittenbach,
Dav. McHardy,

A true copy of the record. FRANCIS A. WALKER, Chief of the Bureau of Awards.
Given by authority of the United States Centennial Commission.

[L.S.] J. L. CAMPBELL, Secretary.

A. T. GOSHORN, Director-General.
J. R. HAWLEY, President.



After forty years' experience we offer to the trade our Centennial Screws, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at the same price as the old style screw.

The new screws will be packed in manila colored boxes with the new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade-mark, which is also secured to us.

The accompanying engravings show the progress of making screw from the old blunt point to style now adopted.

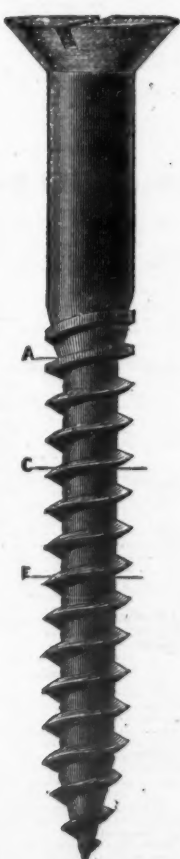
Experience has shown that the wear point of screws, as formerly made, is at the heel of the thread, where all

1776.



1846.

Patented August 30.



Section at Line A B

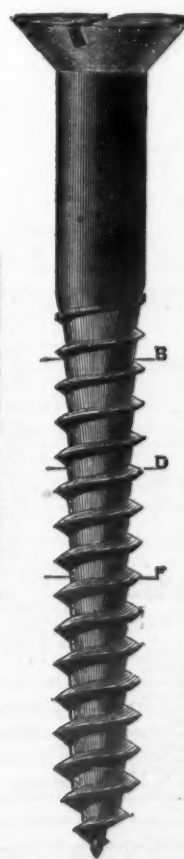
Section at Line C D

Section at Line E F

1876.

Patented May 30.

COVERED BY TRADE MARK.



Section at Line A B

Section at Line C D

Section at Line E F

Estimated to be FIFTY PER CENT. stronger than a Screw as Commonly made.

the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated. See sections at lines.

CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

B. KREISCHER & SONS, FIRE BRICK AND CLAY RETORT WORKS.

Established 1845.
Office, foot of Houston Street, East River,
NEW YORK.
The largest stock of Fire Brick of all shapes and
sizes on hand and made to order at short notice.
Cupola Brick, for McKenzie Patent,
and others. Fire Mortar, Ground Brick, Clay and
Sand. Superior Kaolin for Rolling Mills and found-
ries. Stone Ware and other Fire Clay and Sand,
from my own mines at New Jersey and Staten
Island, by the cargo or otherwise.

NEWTON & CO.,

Successor to
PALMER, NEWTON & CO.,
ALBANY, N. Y., Manufacturers of

FIRE BRICK Stove Linings, Range and Heater Linings Cylinder Brick, &c., &c.

M. D. Valentine & Bro
Manufacturers of

FIRE BRICK And Furnace Blocks DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

A. HALL & SONS, Perth Amboy, N. J.
ESTABLISHED 1845.
HALL & SONS, Buffalo, N. Y.
ESTABLISHED 1855.

FIRE BRICK

of reliable quality for all purposes, manufactured of
the best New Jersey Fire Clays. Also, Architectural
Terra Cotta, Fire Clay, Fire Sand, Kaolin, Ground Fire
Brick and Diamond Building Brick.

Brooklyn Clay Retort AND FIRE BRICK WORKS.

Manufacturers of Clay Retorts, Fire Bricks, Ga
House and other Tile, Cupola Brick, &c. Dealers in
and Miners of Fire Clay and Fire Sand. Clay bank at
Burr's Creek, New Jersey. Manufacture: Van Dyke,
Elizabeth, Richards and Partition Sts., Brooklyn, N. Y.
Office No. 38 Van Dyke St.

Watson Fire Brick Manufactory

ESTABLISHED 1836.
JOHN B. WATSON, Perth Amboy, New Jersey.
Manufacturer of
FIRE BRICK,
For Rolling Mills, Blast Furnaces, Foundries,
Gas Works, Lime Kilns, Tanneries, Boiler
and Grate Setting, Glass Works, &c.
FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE.

HENRY MAURER, Proprietor of the Excelsior Fire Brick & Clay Retort Works,

Manufacturer of FIRE BRICK, HOLLOW
BRICK AND CLAY RETORTS.
WORKS, PERTH AMBOY, NEW JERSEY.
Office & Depot: 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS

Troy, N. Y.,
JAMES OSTRANDER & SON,
ESTABLISHED 1845,
Manufacturers of
FIRE BRICK,
Tuyeres, Tiles, Blast Furnace Blocks, etc. Miners and
Dealers in Woodbridge Fire Clay and Sand, and Staten
Island Kaolin.

GARDNER BROTHERS,

MANUFACTURERS OF
**STANDARD SAVAGE
Fire Brick, Tile & Furnace Blocks,**
OF ALL SHAPES AND SIZES.
Clay Gas Retorts and Retort Settings,
AND
Miners and Shippers of Fire Clay.
Office: 375 Penn Ave., Pittsburgh, Pa.
WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

BORNER & O'BRIEN,

Manufacturers of
Fire Bricks,
Clay Gas Retorts,
Retort Settings,
Tiles, Blocks, &c., &c.
23d St., below Vine,
PHILADELPHIA.
Eighteen years' practical experience.
CYRUS BORNER. WM. J. O'BRIEN

MILLER'S BRICK PRESSES

(Established 1845)
FIRE and RED BRICK,
And Brickmakers' Tools in General.
SAML. P. MILLER & SON,
309 South 5th St., Philadelphia.

W. & J. TIEBOUT,

Manufacturers of
**Brass, Galvanized & Ship
Chandlery Hardware,**

No. 299 Pearl Street, New York.

DOC'S IMPROVED ELEVATOR BUCKET.



Made of Best Charcoal Stamping Iron.
No Corners to Catch.
Light Running and Very Durable.
The only Scientifically Constructed Elevator Bucket
in the Market.

THE STORE-HOUSE BUCKET.
(Partial straight front.)
In 12 in., 14 in., 16 in. and 17 in. Sizes.

T. F. ROWLAND,

Sole Manufacturer,
CONTINENTAL WORKS, Brooklyn, E. D., N. Y.
Send for Circular.



THE HILL BUCKET.
In 3 1/2 in. to 16 in.
Sizes.

NICHOLSON FILE CO., Manufacturers of FILES AND RASPS.

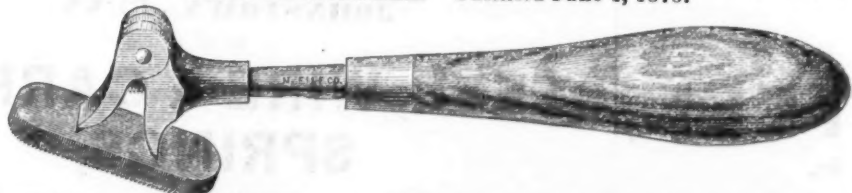
Filers' Tools & Specialties.

Manufactory and Offices at Providence, R. I.

The following space will be used in illustrating our specialties, the matter being changed weekly.

STUB FILES AND HOLDER.

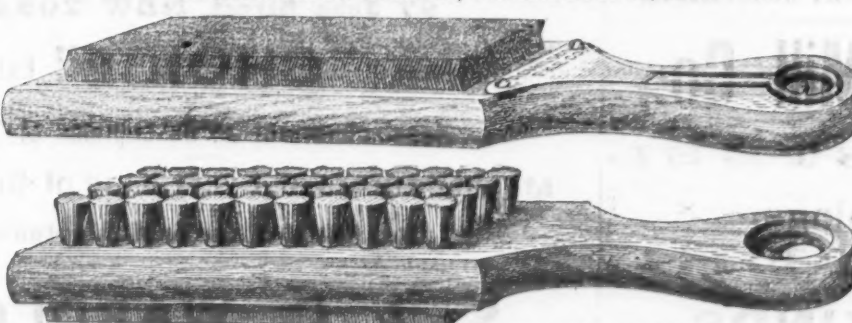
FILES DETACHABLE. Patented June 4, 1878.



MACHINISTS' SCRAPERS.



SURFACE FILE HOLDER, Patented June 12, 1877.



FILE CARD AND BRUSH, Patented Feb. 12, 1878.



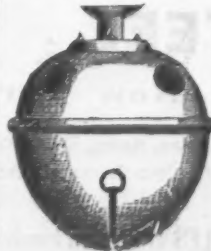
WISE FILE HOLDER, Patented June 12, 1877.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,
Butchers' Choppers,
Axes and Hatchets,
Grub Hoes and Mattocks,
Mill Picks,
Box Chisels and Scrapers,
Ring Bush Hooks,
Ax Eye Bush Hooks,
Socket Bush Hooks,
Watt's Ship Carpenters' Tools,
Carpenters' Drawing Knives,
Coopers' and Turpentine Tools.

FOR SALE BY

MARTIN DOSCHER, Agent, 96 Chambers Street, N. Y.



Established 1838.
**Bevin Bros. Mfg.
Co.,**
Easthampton, Ct.
Manufacturers of
SLEIGH BELLS.
House, Tea, Hand,
Song Bell &c.
No. 1 Metal Setting.

John T. Lewis & Bros
No. 231 South Front St.,
PHILADELPHIA.



TRADE MARK.
MANUFACTURERS OF
Pure White Lead, Red Lead, Litharge,
Orange Mineral, Linseed Oil,
AND PAINTERS' COLORS
Brooklyn White Lead Co.



TRADE MARK.
White Lead, Red Lead & Litharge.
89 Maiden Lane, NEW YORK.
FISHER HOWE TREASURER.

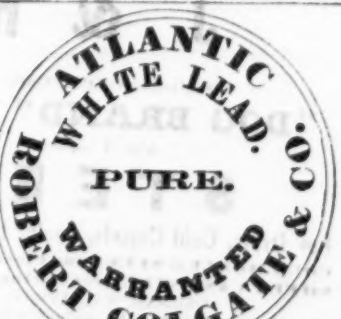
JOHN JEWETT & SONS

Manufacturers of the well-known brand of

WHITE LEAD.



TRADE MARK.
ALSO MANUFACTURERS OF
LINSEED OIL.
182 Front Street, NEW YORK.



TRADE MARK.
**The Atlantic White Lead
and Linseed Oil Co.,**
MANUFACTURERS OF
White Lead (Atlantic), Red Lead,
Litharge & Linseed Oil.
ROBERT COLGATE & CO.,
287 Pearl Street, New York

S. H. JENNINGS, Deep River, Conn.
Importers of and Sole
Agent in the United States for JENNINGS'S A. A.
ENGLISH WHITE LEAD, RED LEAD and LITH-
ARGE. Genuine. Best Quality. Low Prices.
Do not hesitate to write for information.



DUNBAR BROS.,
Manufacturers of
Clock Springs and Small Springs
of every description, from best Cast Steel,
BRISTOL, CONN.

JOHN STARR,

Hardware & Metal Broker,
AND
MANUFACTURERS' AGENT,
Halifax, Nova Scotia,

Representing in the Dominion of Canada several
American Manufacturers, is ready to accept
further Agencies. Satisfactory references.

Steel.

R. H. WOLFF & CO.,

MANUFACTURERS, IMPORTERS, EXPORTERS & GENERAL MERCHANTS.

MANUFACTURERS OF

CAST STEEL WIRE for all Purposes, Special Wire,
Market Steel Wire, Prime Coppered Spring
Wire, and of all Kinds of Furniture
Springs, &c.

Importers of IRON & STEEL, WIRE RODS, &c.

Sole Agents for COCKER BROS., Limited, Sheffield, England.

MANUFACTURERS OF

Cast Steel, Wire, and "Meteor" Wire Plates.

Sole Agents for "PR. HOMO" Dec. Cast Steel, Gun Barrels, Moulds and Ordnance.

EXPORTERS AND GENERAL MERCHANTS.

Direct all communications to

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Office and Warehouse, 46 Cliff St., New York.

F. W. MOSS,

Successor to JOSHUA MOSS and GAMBLE BROS.

80 JOHN ST., NEW YORK.

STEEL AND FILES,

Hammers, Anvils, Vises, Blacksmiths' Tools.

WARRANTED CAST STEEL. Specially adapted for Dies, Punches,
Turning Tools, Drills, &c.

ALSO, THE WORLD-RENOVED

IMPROVED MILD CENTERED CAST STEEL.

Specially adapted for Taps, Reamers, Milling Tools, &c. Warranted
not to crack in hardening Tools of any size.

SHEET, GERMAN, MACHINERY, SPRING AND EVERY OTHER DESCRIPTION OF STEEL.

Phila.—J. S. Watson & Son, Agents, 512 Commerce St.,
Franklin Works, Wadsley Works, Walkley Works, Sheffield, England.

MILLER, METCALF & PARKIN,

Pittsburgh, Pa.,

Manufacturers of

CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &c.

Polished, Compressed Drill Rods and Wire,

Warranted equal to any imported in quality, finish and accuracy.

Also Common Grades.

Established 1810.

J. & RILEY CARR,

SHEFFIELD, ENGLAND.

Manufacturers of the "Celebrated

"DOG BRAND" FILES.

Also of superior

STEEL

For Drills, Cold Chisels, Tools, Taps, Dies, &c.

COLD ROLLED STEEL for Clock Springs, Corsets, &c.

SHEET CAST STEEL for Springs, Saws, Welding and Stamping Cold, &c.

GERMAN, MACHINERY, ENGLISH AND SWEDISH SPRING STEEL,
And all other descriptions for machinists and agricultural purposes.

Warehouse, 30 Gold Street, New York.

Near John Street.

HENRY MOORE, Agent.

Cleveland Rolling Mill Co.,

Manufacturers of

BESSEMER STEEL

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Iron Rail and Fastenings,

SPRING STEEL

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WIRE OF ALL KINDS,

Steel Horse Shoes, Tire, Axles and other Forgings,

Boiler Plate, Galvanized and Black Sheet Iron, Corrugated Roofing and
Siding of Siemens-Martin, Bessemer Steel and Iron.

All made from our own Lake Superior Ores.

CLEVELAND, OHIO.

AGENTS FOR THE UNION STEEL SCREW CO.

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President, Cleveland, Ohio.

A. B. STONE,

Vice-Pres., No. 52 William St., New York.

GEO. SANDERSON & CO.,

MANUFACTURERS AND

Importers of STEEL,

Removed to 30 Gold Street, New York.

Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS,
TABLE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for
CLOCK SPRINGS, CORSET CLASPS, &c.

A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

Steel.

NEWARK STEEL WORKS.

BENJAMIN ATHA & CO.,

Manufacturers of

BEST REFINED CAST STEEL.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS

A full assortment of this universally approved OLD BRAND and other Steels for sale by

EDWARD FRITH & SON, Agents,

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LOUIS E. FRITH.

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SMITH, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

Post Office Address, Pittsburgh, Pa.

Represented at Boston by WETHERELL BROS., 21 Oliver St.; at Milwaukee by JOHN FRITELAFF, 43 to 45 West
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MANUFACTURERS OF

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MERCHANT BARS, TIRE AND SHAFTEING.

Railroad Iron, Pig Iron, Merchant and Ship Iron.

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STEEL, WIRE & CARRIAGE SPRINGS,

Of all Kinds, of the Best Quality.

WIRE RODS, HORSE RAKE TEETH, STEEL FINGER BARS AND WIRE FENCE STAPLES.

Tire Steel,
Toe Calk Steel,
Spring Steel,
Machinery Steel,
Bessemer Rounds and
Squares,
Sleigh Shoe Steel,
Cutler Shoes,
Harrow Teeth,
Scythe Back Steel,
Grain Drill Steel,
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specialty.
All orders filled promptly.

Bright Wire,
Annealed Wire,
Coppered Wire,
Galvanized Wire,
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Wire for Barbed Fencing,
Wire for Tanners' Stock,
Wire for Rope,
Wire for Furniture
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Wire for Wire Nails,
Round, Square and Shapes Wire,
Wire Straightened and Cut to Length,
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Sole Manufact'rs of "CHOICE" Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

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CHAS. HUGILL, Agent.

S. & C. WARDLOW,

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Manufacturers of the Celebrated

Cast and Double Shear STEEL.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives,
Mining Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

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COG WHEEL

Ice Cream Freezers.

P. R. DUNNE,

Manufacturer,

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NEW YORK.

Torrey's Door Springs.

P. R. DUNNE,

Manufacturer,

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Steel.

R. MUSHET'S Special Steel

FOR

LATHES, PLANERS, &c.

Turns out at least double work by increased speed
and feed, and cuts harder metals than any other
Steel. Neither hardening nor tempering required.

Sole Makers

SAMUEL OSBORN & CO.,

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Represented by

RANDALL & JONES, 10 Oliver St., Boston,
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Gunpowder.

GUNPOWDER.

DUPONT'S

Rifle, Sporting and Blasting Powder

The most popular Powder in use.

Dupont's Gunpowder Mills, established
in 1801, have maintained their great reputation
for 75 years. Manufacture the following cele-
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DUPONT'S DIAMOND GRAIN.

Nos. 1 (coarse) to 4 (fine), unequalled in strength, quick-
ness and cleanliness; adapted for Glass Ball and
Pigeon Shooting.

DUPONT'S EAGLE DUCKING.

Nos. 1 (coarse) to 3 (fine), burning slowly, strong and
clean; great penetration; adapted for Glass Ball,
Pigeon, Duck and other shooting.

DUPONT'S EAGLE RIFLE.

A quick, strong, clean Powder of very fine grain for
Pistol shooting.

DUPONT'S RIFLE, Fg. "Sea Shooting,"
Fg and Ffg.—The Fg for long range rifle shoot-
ing, the Ffg and Ffg for general use, burning
strong and moist.

Also all kinds of Sporting, Mining, Shipping and
Blasting Powders of all sizes and descriptions. Special
grades for experts. Also, Musket, Cannon, Mortar
and Mammoth Powder, U. S. Government standard.
Powder manufactured to order of any required grain
or proof. Agencies in all cities and principal towns
throughout the U. S. Represented by

F. L. KNEELAND, 70 Wall St., N. Y.

N. B.—Use none but Dupont's Fg or Ffg Powder
for long-range Rifle shooting.

GUN POWDER.

Laflin & Rand Powder Co.

No. 26 Murray Street, New York.

Manufacture and sell the following celebrated brands
of Sporting Powder known everywhere as

ORANGE LIGHTNING,

ORANGE DUCKING,

ORANGE RIFLE

more popular than any Powder now in use.

Blasting Powder and Electrical Blasting

Apparatus.

Military Powder on hand and made to order.

SAFETY FUSE, FRICTIONAL & PLATINUM

FUSES.

Pamphlets showing sizes of grain sent free.

Emerg. Grindstones, &c.

Walter R. Wood, GRINDSTONES.

Berea, O., Nova Scotia, & other brands

283 and 285 Front Street, New York.

WORTHINGTON & SONS

North Amherst, Ohio.

Manufacturers of

Lake Huron Amherst
and Berea

GRINDSTONES.

BOYD & CHASE,

The largest manufacturers in the world of

OIL

Of all description.

107th Street and Harlem River.

Send for Illustrated Price List. NEW YORK

H. S. WOOD & CO.,

Manufacturers of

Berea, O.,
Black River, O.,
Lake Huron, Mich.,
Nova Scotia,

Newcastle, Eng.,
Wickersley, Eng.,

GRINDSTONES,

33 West and 58 Washington Sts., N. Y.

S. H. JENNINGS, Deep River, Conn.,
Importer of and Sole
Agent in the United States for the HIGHEST
GRADE of LONDON GROUND EMERY. Prices
low. Do not hesitate to write for information.

THE VICTOR ROCK DRILL

WELL BORE AND PROSPERITY.
The Diploma and Prize Medal awarded it as
the "Centennial" in 1876. Twenty-five of these
hand machines ordered in one day. Good
active Agents can clear \$150 per
week. Send for Circulars and Terms.
Address W. WEAVER, Phoenixville, Pa.

"DRAW CUT" BUTCHERS' MACHINES.

Choppers, Hand and Power
Stuffers,
Lard Presses.
Warranted thoroughly made
and the Best in Use.
MURRAY IRON WORKS,
Burlington, Iowa.

Steel.

THE EDGAR THOMSON STEEL CO., LIMITED.

MANUFACTURERS OF

STEEL RAILS, BLOOMS & INGOTS

General Office and Works at Bessemer Station (Penn. R. R.), Allegheny County, Pa.

New York Office, 57 Broadway.

The members of the Edgar Thomson Steel Company, Limited, have had large experience in manufacturing and in railway management; their works are the most complete in the world, with all the late improvements, and are located in the best Bessemer metal district in the United States, and their managing officers are experienced in the manufacture of Bessemer Steel.

The Company warrants its rails equal in quality to any manufactured in the United States.

Rails of any weight or section furnished on short notice. Orders for trial lots solicited.

Branch Office and P. O. Address, No. 48 Fifth Ave., Pittsburgh, Pa.
D. McCANDLESS, Chairman. WM. P. SHINN, General Manager.

JOHN WILSON'S CELEBRATED

BUTCHERS' KNIVES,
BUTCHERS' STEELS,
AND
SHOE KNIVES.



THE TRADE MARK, IN ADDITION
TO THE NAME,
IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY
JOHN WILSON.

GRANTED A.D. 1766, BY THE
CORPORATION OF CUTLERS OF SHEFFIELD,
AND PROTECTED BY ACT OF PARLIAMENT.

Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750

BUYERS ARE SPECIALLY CAUTIONED AGAINST
IMITATIONS OF THE MARK, AND THE
SUBSTITUTION OF COUNTERFEITS
BEARING THE NAME, "WILSON," ONLY.

North Chicago Rolling Mill Co.

ESTABLISHED 1857. CAPITAL, \$3,000,000. INCORPORATED 1865.

Works at Chicago, Ill., and Milwaukee, Wis.

MANUFACTURERS OF

MERCHANT BAR, FISH PLATES, PIG METAL,
IRON RAILS & BESSEMER STEEL RAILS.

CAPACITY OF WORKS:

Fish Plates.....	20,000 tons
Merchant Bar.....	10,000 "
Pig Metal.....	80,000 "
Iron Rails.....	80,000 "
Steel Rails.....	60,000 "
Total Capacity per year.....	250,000 "

OFFICES:

17 Metropolitan Block, Chicago, Ill.
37 Mitchell Block, Milwaukee, Wis.

O. W. POTTER, President, CHICAGO.
S. P. BURT, Vice-President, NEW BEDFORD.
S. CLEMENT, Treasurer, MILWAUKEE.
R. C. HANNAH, Secretary, CHICAGO.

HERMANN BOKER & CO.,

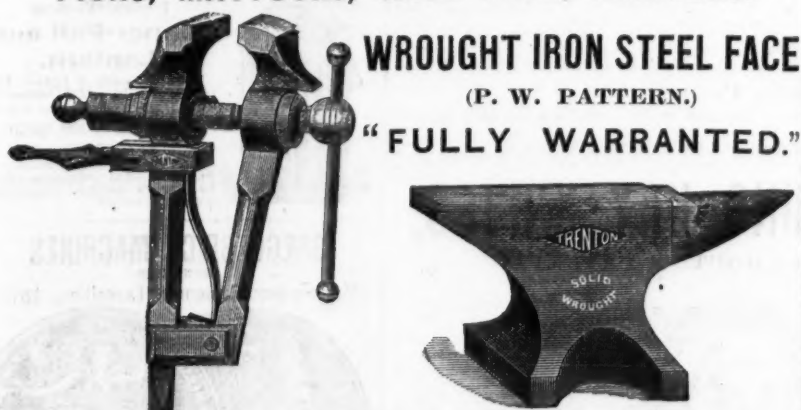
101 and 103 Duane Street, New York,

PROPRIETORS OF



VICE & TOOL WORKS.

PICKS, MATTOCKS, GRUB HOES, HAMMERS.



WROUGHT IRON STEEL FACE
(P. W. PATTERN.)

"FULLY WARRANTED."



Sole Agents for

H. Boker & Co.'s Celebrated "Tree" Brand Cutlery.
H. Heinsch's Sons' Unrivaled Shears, Trimmers, Scissors, Japanned and Nickled.
Ward & Payne's Sheep Shears. Peugeot Brothers' Horse Clippers.

J. W. GARDNER'S

Unequaled and "Warranted Superior to All"

Pocket Knives and Barlows.

Also a full stock of

Geo. Wostenholm & Sons', W. & S. Butcher's,

Manhattan and O. K.

POCKET CUTLERY & RAZORS.

LAMSON & GOODNOW MFG. CO.

TABLE CUTLERY,

Guns and Pistols

FISHING TACKLE,

Arms and Ammunition.

Philadelphia Smelting Co.,

S. E. Cor. Twelfth and Noble Sts., PHILADELPHIA.

GENUINE BABBITT,

Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years.

ALL GRADES OF ANTI-FRICTION METALS.

DEOXIDIZED BRONZE,

Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals, Solders, Stereotype Metal, Gas and Steam Fittings and Fixtures, Brass and Composition Castings.

Send for circulars.

WIRE NAILS

French Points, Window Shade Nails,
Upholstering, **WAGON NAILS**, Molding Nails,
(Sample Cards sent on application.)
Electrotype, Roofing Nails,
Barbed Caster Nails.

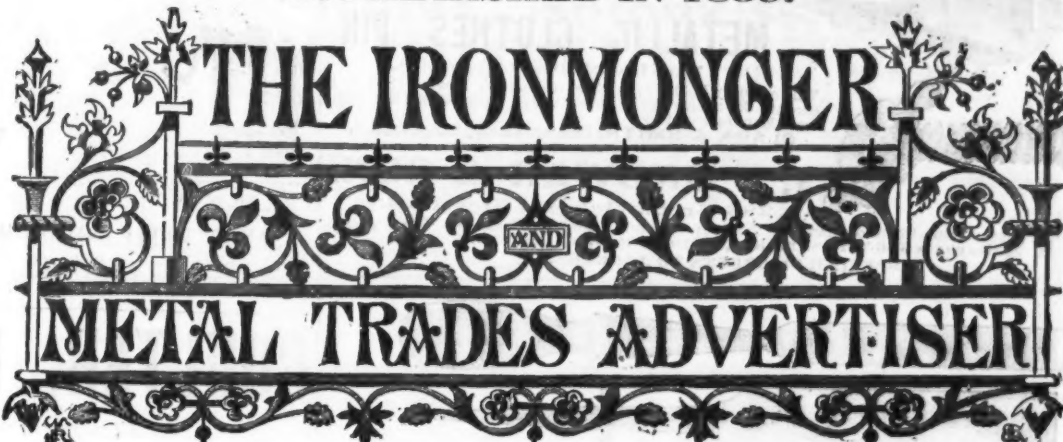
Veneer Nails, Label Tacks and small Nails of all kinds, Cabinet Nails, Barbed Lock Nails, Cigar Box Nails, &c., &c., put up in bulk, 5 lb. packages: 1 lb. papers, or as wanted.

AMERICAN WIRE NAIL CO.

Factory, Fifteenth and Madison Sts.

COVINGTON, KY.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

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SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated. **Special Correspondents.**—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. **The Week, Legal News, Trade Notes, Bankruptcies, Foreign Notes, Colonial Affairs, Merchants' Circulars, Imports and Exports, &c.** are each departments of the journal, containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger* and *Metal Trades Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful *Ironmongers' Diary and Text Book*, a work sold to non-subscribers at 75 cents.

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THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual presented free to every Subscriber to the *IRONMONGER AND METAL TRADES ADVERTISER*. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt, and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT

Is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication in 1879 will be as follows: JANUARY 11, FEBRUARY 8, MARCH 8, APRIL 5, MAY 3 and 31, JUNE 28, JULY 26, AUGUST 23, SEPTEMBER 20, OCTOBER 18, NOVEMBER 15, DECEMBER 13.

This Supplement is published in

FIVE LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach out in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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Advertisers will do well to use illustrations freely. Where economy of space is an object, a left page illustrated and described, in one language, can be suitably described in four or more languages on the opposite or right page without illustrating.

THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and *Foreign Supplement* is a strikingly powerful and most efficient way of publicity, not to be compared with any of the other ordinary channels of communication.



Barnes' Adjustable Pipe Tongs.

Patented January 9, 1877.

DIPLOMA AWARDED BY THE AMERICAN INSTITUTE FAIR, AT NEW YORK, NOVEMBER, 1876.

MANUFACTURED BY THE

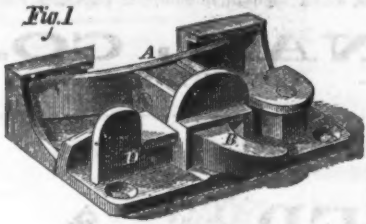
MANSFIELD ELASTIC FROG CO.,

Send for descriptive circular.

New Haven, Conn.

THE PERFECT SASH TIGHTENER AND LOCK.

Fig. 1



Manufactured entirely from Malleable Iron, Burglar Proof, Anti-Rattling, Draws Sash to Exact Center. No Springs to Get out of Order.

The Best in the Market.

METALLIC CLOTHES PIN.

For either Wire or Rope Line.

Will securely hold any article, from a silk handkerchief to a carpet. No article can be blown away. Does not soil the clothing. Manufactured by

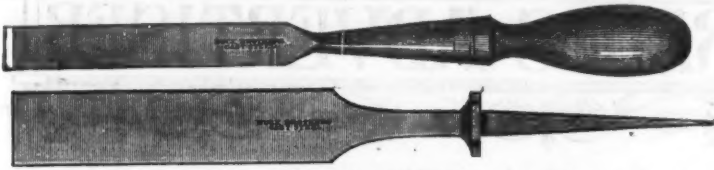
CLARK & SMITH, Patentees, Chester, Orange Co., N. Y.

SOLE AGENTS,

J. I. BROWER & SON,

286 Greenwich St., New York.

Who keep a general assortment on hand for the country trade. Jowett's Horse Raps, 14, 15 and 16 inch, Maharay's \$10 Tire Shrinker, Heller's Raps. Send for Circular. SPECIAL DISCOUNTS TO JOBBERS.



BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of

Shank, Socket Firmer and Socket Framing Chisels,

PLANE IRONS.

Gauges of all lengths and circles beveled inside or outside. Nail Sets, Scratch and Belt Awns. Chise Handles of all kinds. Carving Tools. Also small Boxes of tools of best quality.



No. 1.

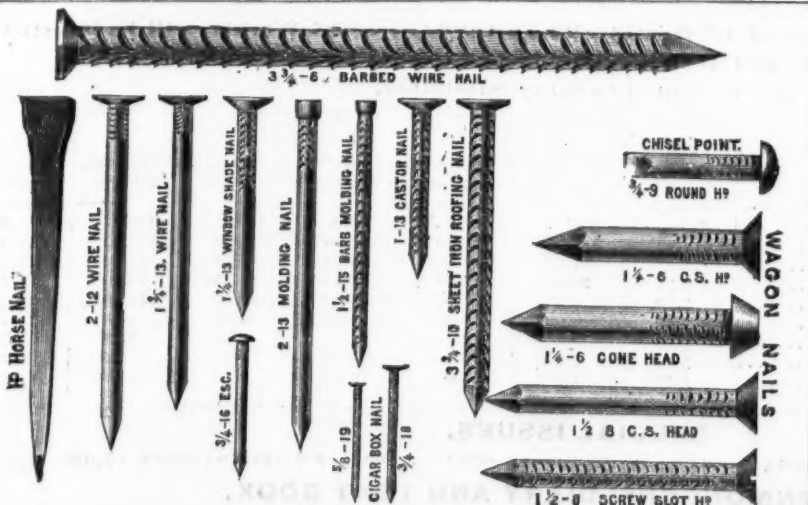
NEW sizes Patent Malleable Iron Oilers, Nos. 2 and 3. pattern Heavy Screw Clamps; strongest in the market. Send for Price List.

Malleable Iron Castings

Of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO., Branford, Conn.

No. 2.



HORSE SHOE & WIRE NAILS

Steel, Iron and Brass Nails and Barbed Nails

Of every kind.

Roofing and Moulding Nails, Escutcheon Pins, Chair and Caster Nails, Cigar Box and Window Shade Nails, Wagon and Boat Nails.

Manufactured by

THE HP NAIL COMPANY,

Cleveland, Ohio.

NORTHWESTERN

HORSE NAIL CO.

ESTABLISHED IN 1862

Hammered & Finished Horse Nails.

We offer our Finished Nail to the trade with the confidence that it has no equal in the market. It is the genuine "Northwestern" Nail, Finished, and we give it our unequalled guaranty.

Office and Factory, 56 to 68 Van Buren St., Chicago.

A. W. KINGSLAND, Secretary.

Our agents, Graham & Hajnos, 113 Chambers Street, New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS AND VALVES,

For STEAM, WATER

and GAS.

Iron Pipe and Fittings.

PLUMBERS' MATERIALS

New Illustrated Catalogue and Price List sent by express to the Trade on application.

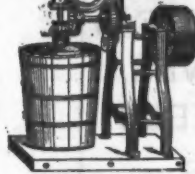


Factory, Paterson, N. J.

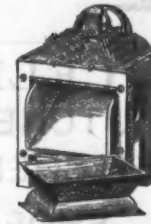
56 John Street, N. Y.



HAND FREEZER. 2 to 25 qts. \$3.50 to \$25.00



HAND OR POWER. 25 and 50 qts. \$75.00 and \$175.00



HAND OR POWER. ICE CRUSHER. \$75.00

SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS. Galvanized iron outside, tin inside. No exertions of force need be feared in the use of this freezer. Simple in construction, perfect in results. Send for descriptive circular and discounts of this celebrated freezer. Address **WHITE MOUNTAIN FREEZER CO.,** Laconia, N. H.

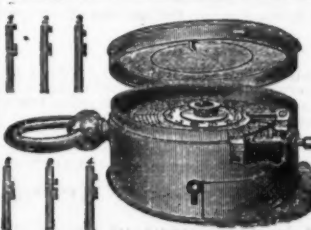
COULTER, FLAGLER & CO.,

87 Chambers and 69 Reade Sts., New York,

Hardware Manufacturers' Warehouse.



Office and Warehouse of Union Hardware Co.; Rugg Mfg. Co., Draw Knives, Chisels, &c.; Deuse Bros., Bits, Corkscrews, &c.; Richardson Bros., Saws of all kinds; Brooks Edge Tool Co.'s Axes, Hatchets, &c.; M. Price, Hatchets, &c.; J. & W. Rothery, Extra Hand Cut Files; L. D. Frost, Carriage Bolts, Refined and Norway Iron; Cowles Hardware Co., Screwdrivers, Mining Knives, &c.; Rider, Wooster & Co., Anti-Friction Barn Door Hangers, &c.; H. B. Hawley, Shears of all kinds; Walden Knife Co., Pocket Cutlery; American Screws; N. Y. Anti-Friction Metal Co.'s Rabbitt Metals; Howard, Razor Strops; C. Forschner Spring Balances; P. Lowenthal & Co., Dividers, Callipers, &c.; Shepard Hardware Co., Fluters, Blind Hinges, &c.; Saxton & Amedon, Braces, all kinds; Devia Bros. Mfg. Co., Bells, all kinds; R. H. Parsons & Bro., Pliers, Nippers, &c.; C. L. Griswold, Cast Steel Bits; Lancaster Lock Works, Jail Locks.



BUERK'S Watchman's Time DETECTOR.

IMPORTANT FOR ALL LARGE CORPORATIONS AND MANUFACTURING CONCERNS.

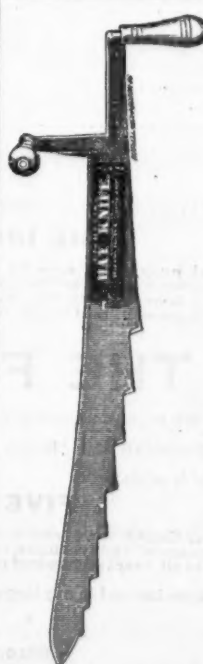
Capable of controlling with the utmost accuracy the motion of a watchman or patrolman as the same reaches different stations of his beat. The instrument is complete in itself, portable and as reliable as the best lever watch. It requires no fixture or wires communicating from room to room, as is the case with the ordinary watch clocks. A small, inexpensive stationary key is alone required at each station. The instrument will, in all cases, be warranted perfect and satisfactory. N. B.—The suit against Imhaeuser & Co., of New York, was decided in my favor, June 10, 1874. Another suit has been decided against them and a fine assessed Nov. 11, 1876, for selling contrary to the order of the Court. Persons using clocks infringing on my Patent will be dealt with according to law.

J. E. BUERK, Proprietor,

P. O. Box 979.

No. 230 Washington Street, Boston.

In sending for circular or ordering the above, please mention this paper.



LIGHTNING HAY KNIVES, WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marches.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 50 lbs. weight, suitable for shipping by land or water to any part of the world.

Manufactured only by

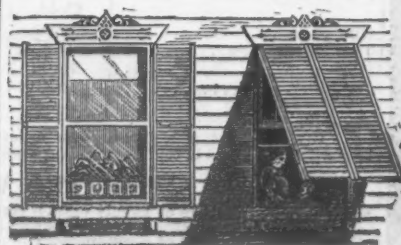
HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

SEMPLE & BIRGE MFG. CO., Agents at St. Louis.

Dearborn's Pat. Adjustable Blind Awning Fixtures.



Either old or new Blinds thus fitted can be opened in the usual way or used as an awning at pleasure.

For particulars address the sole manufacturers,

BOSTON BLOWER CO.,

Boston, Mass.

THE "OLD RELIABLE" UNIVERSAL Clothes Wringer.



Improved with Rowell's Double Cog-Wheels on both ends of each roll.

Over 500,000 sold!

And now in use, giving "Universal" satisfaction

EVERY WRINGER WARRANTED.

Be sure and inquire for the "Universal."

Sold by the Principal Jobbers in Hardware and House-Furnishing Goods everywhere.

Special rates given for export.

Metropolitan Washing Machine Co.

32 Cortlandt St., New York.

WM. S. CARR & CO.



Sole Manufacturers of

CARR'S

PATENT

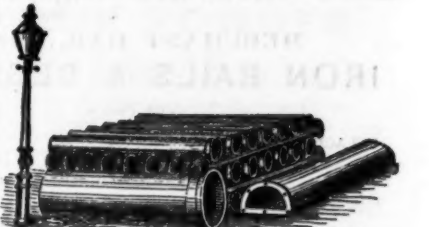
Water

Closets,

PUMPS, CABINET WOOD WORK, &c.

108, 108 & 110 Centre Street,

Factory, Mott Haven, NEW YORK.



R. D. WOOD & CO.

Philadelphia,

Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS.

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.



The Patent Combined Dinner-Pail and Lantern.

The most perfect Dinner Pail in the world. Hot coffee for dinner and a Lantern at night.

Manufactured by JOS. HAIGHT,

Port Chester, N. Y.

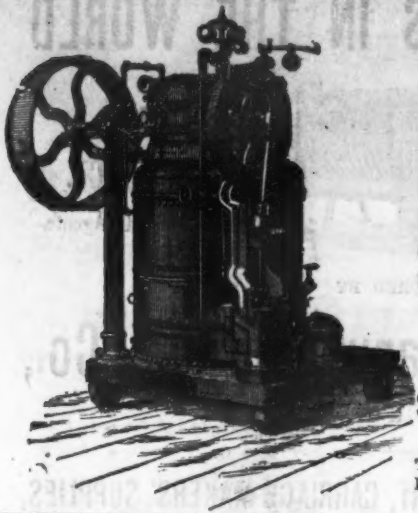
Sent by express on receipt of \$1.00. Special attention given to export orders. Traveling Agents Wanted.

GREGG BRICK MACHINES

"Masterpieces Centennial Exposition, 1876."



Awarded Highest Prize Paris Exposition, 1878. The above is a cut of Gregg's No. 2 Brick Machine, simple, strong and efficient, for making and re-pressing bricks. Gregg's Triple Pressure Brick Machines. Gregg's Steam Power Re-pressing Machines. Gregg's Hand Power Presses. Agents wanted in every city and town. Send for catalogue. **GREGG BRICK CO.,** 408 Walnut St., Philadelphia, Pa.



SHAPLEY ENGINE.

Patented Feb. 10, 1874.
Reissued June 22, 1875.
Compact, Practical, Durable and Economical.

Acknowledged to be the best in use. This boiler stands unrivaled.

MANUFACTURED BY

SHAPLEY & WELLS,

Binghamton Iron Works,
Binghamton, N. Y.

Stationary Engines and Boilers.

Also Machinery for Mills of all kinds and Tanneries. Also their celebrated Bark Mills, acknowledged to be the best. Send for reduced price list circular.

THE PROVIDENCE TOOL COMPANY'S

Patent Anti-Friction Hoisting Block.

For hoisting Coal, Ore, Ice, or other heavy work, where Steam or Horse power is used. Made of Galvanized Iron and Steel, and not affected by exposure to weather.

Twenty-four feet hoist turns the friction wheels on the side around once.

The Block uses 3 inch to 4 inch rope, and will sustain with safety a load of 4 tons.

Will run either end up, or on its side. The lightest running and most durable Block yet produced.

Satisfaction guaranteed. Try one.

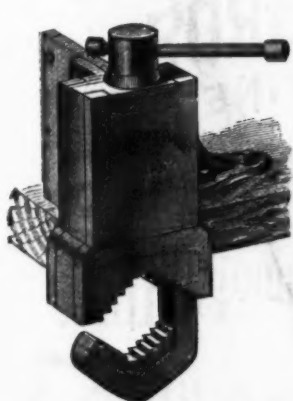
Send for Price List of Blocks.



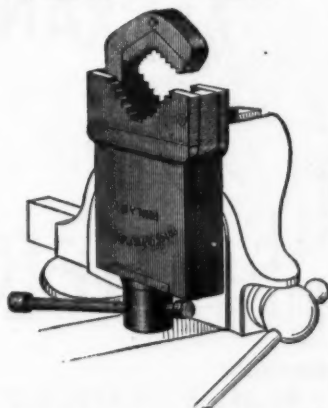
Providence Tool Co.,

PROVIDENCE, R. I.

IMPROVED PIPE-FITTERS' VISE.



STRONG,
LIGHT,
EFFICIENT,
CHEAP.



To meet the requirements of the large number of persons who have use for such an article, we invite attention to our Improved Pipe Vise. This Vise can be used either as a permanent fixture to work bench, attached to angle plate or can (unlike others) be held between the jaws of any Machinist's or Blacksmith's Vise; the movable jaw being OPEN ON SIDE permits work to be gripped at any desired point without slipping it in from end, and allows of FITTINGS BEING HELD securely; the Box is made of Malleable Iron, the Screw of Wrought Iron, and the remainder of Solid Steel throughout. The Steel Gripping Jaws can be duplicated and replaced at any time when worn out. It is a very convenient tool, well adapted to the wants of Plumbers, Pump Fitters, Well-Drivers, and all who have use for a tool that is strong, light, efficient and cheap which can be readily carried about with kit of tools.

MANUFACTURED BY

PANCOAST & MAULE,

243 and 245 South Third Street, Philadelphia.

Wheeler, Madden & Clemson

MFG. CO.,

MIDDLETOWN, NEW YORK.

Manufacturers of

WARRANTED CAST STEEL

SAWS

Of every description, including

Circular, Shingle, Cross-Cut, Mill, Hand.
WOOD SAWS, Etc., Etc.

AMERICAN SAW CO.,

Manufacturers of

Movable Toothed Circular Saws,

PERFORATED CROSS-CUT SAWS

And SOLID SAWS of all kinds,

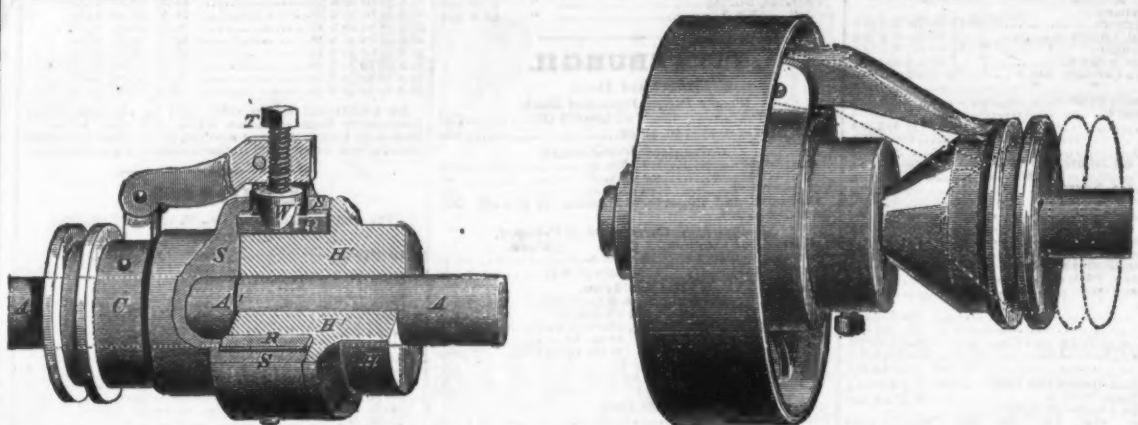
Trenton, N. J.



Manufacturers of GALVANIZED PUMP CHAIN FOR CHAIN PUMPS.



PATENT
Expanding, Self-Draining
RUBBER BUCKET.
Manufactured only by
L. M. RUMSEY & CO.



PATENT HUB FRICTION CLUTCH.

Manufactured by the **HUB FRICTION CLUTCH CO., Limited, Philadelphia.**

We claim for this device the following advantages for a perfect clutch, it having been adopted by several of the leading manufacturers of machinery and machinists' tools: It works easily but effectively. It works instantly and without noise. It is very durable, and is extremely simple and cheap, and has proven itself to be the best clutch in the market. Special arrangements can be made with leading manufacturers for the adoption of this clutch for their own tools. This clutch can and will be sold for less money than any other clutch in the market.

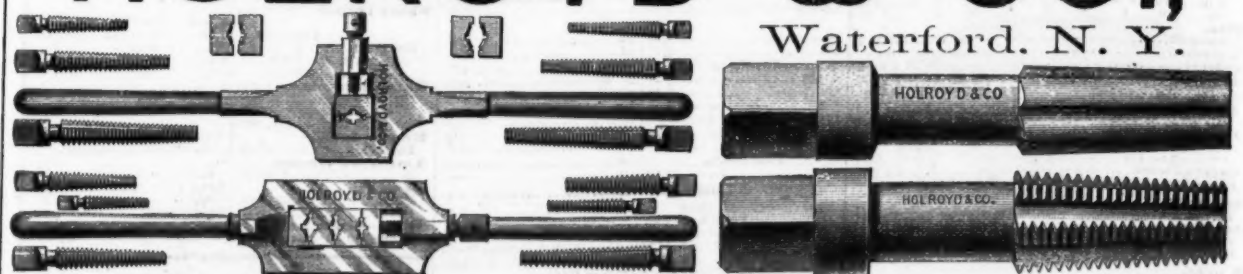
For sale by Geo. Y. Cresson, Philadelphia; Morton, Reed & Co., Baltimore.

H. S. MANNING & CO., NEW YORK AGENTS, 111 Liberty Street

JAMES SMITH & CO., Mfg. Agents, 137 Market Street, Philadelphia.

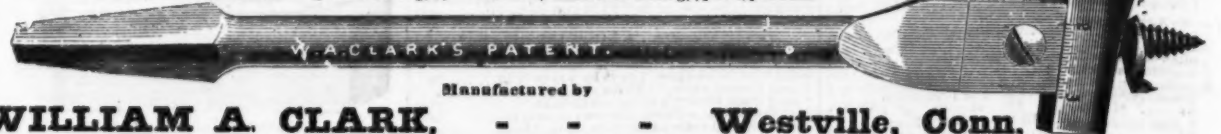
HOLROYD & CO.,

Waterford, N. Y.



CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other
Two sizes: Large Size Boring, 1/4 to 3 inches; Small Size Boring, 1/8 to 1 1/4 inches.



Manufactured by
WILLIAM A. CLARK, - - - Westville, Conn.

THE "Ramsay Improved Steam Winder,"

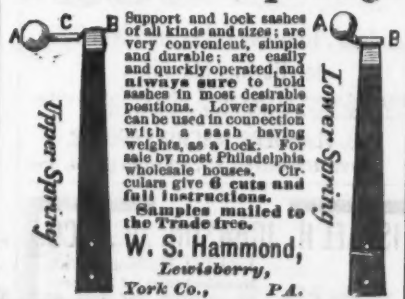
Manufactured by

H. A. RAMSAY & CO.,

Vulcan Iron Works,

Baltimore, Md.

HAMMOND'S Window Springs



HYDRAULIC JACKS AND PUNCHES,

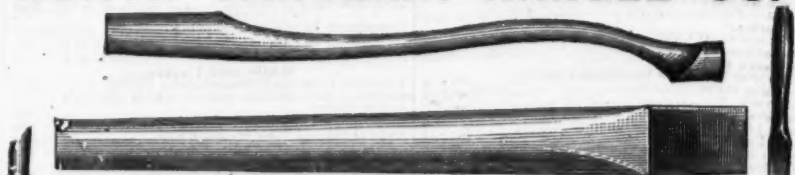
FOR
Raising Heavy Weights,
Punching Iron, &c.

HYDRAULIC PRESSES

On hand and made to order.
Second-hand Hydraulic Presses
bought and sold.
Machinery for Polishing and
Buffing Metals. Send for Circular.

E. LYON & CO.,
470 Grand Street,
NEW YORK.

HUNDLEY & HANKS, PROPRIETORS OF NORTH CAROLINA HANDLE CO.



MANUFACTURERS OF
Handles and Spokes,
79 Reade Street and 97 Chambers Street, NEW YORK.
HARDWARE COMMISSION MERCHANTS.

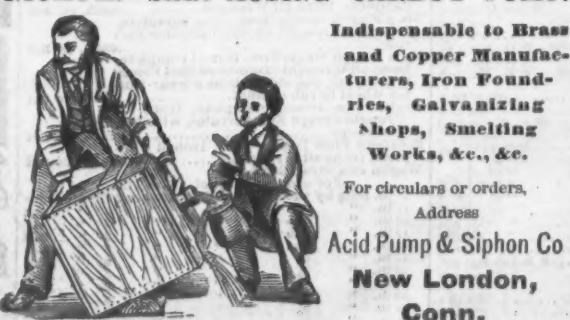
"THE BOSS" JACK-SCREW.

R. D. WYNN,

Windsor, Vt., U. S. A.,

Sole manufacturer of the above Screw. Indorsed by builders, railroad and mining men as the best screw jack in the market. Also manufactures Press Screws, Lard and Wine Presses, Tackle Blocks, &c. Circulars and prices, address as above. (Please say The Iron Age.)

NICHOLS' SELF-ACTING CARBOY PUMP.



Indispensable to Brass and Copper Manufacturers, Iron Foundries, Galvanizing Shops, Smelting Works, &c., &c.

For circulars or orders, Address
Acid Pump & Siphon Co
New London, Conn.



The Old Way.

The New.



ELEVATORS.

**PASSENGER ELEVATORS,
FREIGHT ELEVATORS,
HYDRAULIC ELEVATORS.**

Hydraulic Elevators to Run from City Pressure.
Condensed Air and Hydraulic Elevators Operated
by Steam Pump.
Independent Steam Elevators.
Belt Power Elevators.
Portable Hoisting Machines.

All Kinds of Hoisting Machinery a Specialty.

STOKES & PARRISH,

3001 Chestnut Street, Philadelphia.

JOHN ADT,

20, 22, 24 and 26 Artisan Street, New Haven, Conn., U. S. A.

Automatic machines to straighten and cut wire of all sizes to any length; to cut and mill wire for butt pins, bolt shanks and similar articles; to make all kinds of staples, with either square, fleam, chisel or shear points; to roll points on picture nails and similar articles without heat; to cut and form wire into various shapes and sizes, such as rings, buckles, fence bars and similar articles; to make spiral springs; and for other special purposes to order.

Machines to straighten and cut wire by hand; to rivet together articles of hardware; to drill butts and other hardware; to mill butts; to drill or countersink several holes at once, close together or far apart, on a regular or irregular line; to drill, tap, mill and thread small articles of hardware, such as thumb screws, thumb nuts, &c.; to spin plain or ornamental caps on picture nails, tassel hooks, &c.; for grinding, buffing and polishing; to drive screws into locks, knobs, &c.; foot and hand presses and special power presses to order.

BOLT & PIPE THREADING HEADS

For Attachment to Lathes, &c.



Send for Catalogue and Price List.

STOCKWELL SCREW & MACHINE CO.,
Cleveland, Ohio.

WILEY & RUSSELL MFG. CO.,

Greenfield, Mass.

THE GREEN RIVER TIRE UPSETTER.

LIGHTNING

Screw-Cutting Machinery and
Tools,

Bolt Cutters, for hand or power.

Screw Plates, cutting from wire

sizes to 1 1/2 inch.

Green River Drilling Machines, for

hand or power, with screw-cut-

ting attachment.

Green River Tire Benders.

" Tire Upsetters.

" Tire Measuring Wheels

Tire Bolt Wrenches, Nut Wrenches.

Horse Shoers' Vises.

Taps and Dies for pipe, Bit Braces.

Taps, Dies and Reamers, &c., &c.

Send for Illustrated Price List.

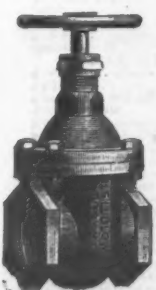


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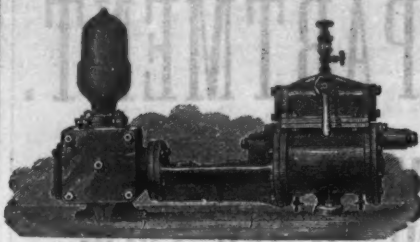
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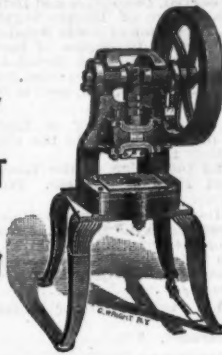
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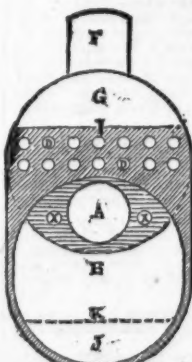
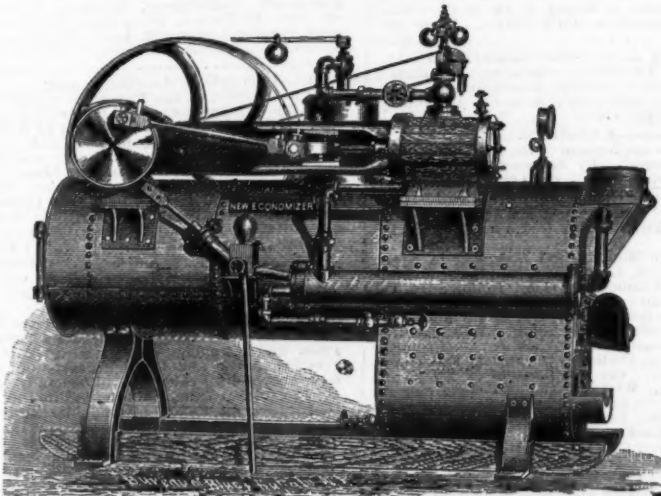
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This Boiler contains all the good points of an ordinary locomotive boiler; the fire-box is entirely surrounded by water, and the flames pass through the large fire-flue almost in a body. There is no obstruction whatever to the draft.

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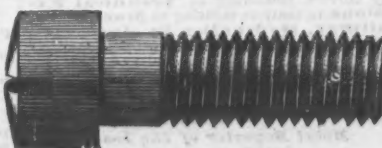
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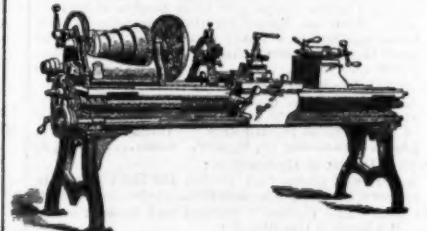
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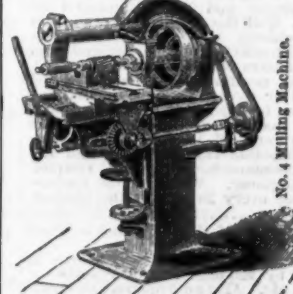
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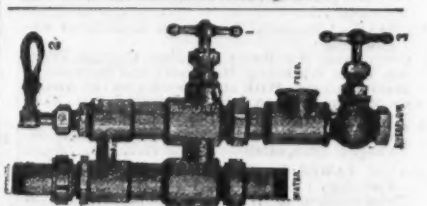
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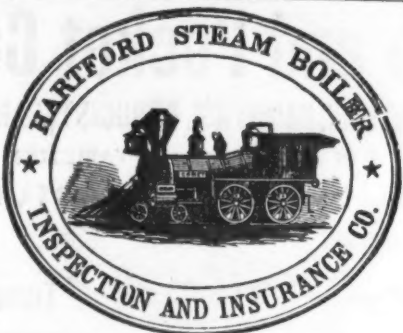
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1/2	20.00	22.00	1.00
3/4	25.00	27.00	1.00
1	30.00	32.00	1.00
1 1/4	35.00	37.00	1.00
1 1/2	40.00	42.00	1.00
1 3/4	45.00	47.00	1.00	....
2	50.00	52.00	1.00	....
2 1/4	55.00	57.00	1.00	....
2 1/2	60.00	62.00	1.00	....
2 3/4	65.00	67.00	1.00	....
3	70.00	72.00	1.00	....
3 1/4	75.00	77.00	1.00	....
3 1/2	80.00	82.00	1.00	....
3 3/4	85.00	87.00	1.00	....
4	90.00	92.00	1.00	....
4 1/4	95.00	97.00	1.00	....
4 1/2	100.00	102.00	1.00	....
4 3/4	105.00	107.00	1.00	....
5	110.00	112.00	1.00	....
5 1/4	115.00	117.00	1.00	....
5 1/2	120.00	122.00	1.00	....
5 3/4	125.00	127.00	1.00	....
6	130.00	132.00	1.00	....
6 1/4	135.00	137.00	1.00	....
6 1/2	140.00	142.00	1.00	....
6 3/4	145.00	147.00	1.00	....
7	150.00	152.00	1.00	....
7 1/4	155.00	157.00	1.00	....
7 1/2	160.00	162.00	1.00	....
7 3/4	165.00	167.00	1.00	....
8	170.00	172.00	1.00	....
8 1/4	175.00	177.00	1.00	....
8 1/2	180.00	182.00	1.00	....
8 3/4	185.00	187.00	1.00	....
9	190.00	192.00	1.00	....
9 1/4	195.00	197.00	1.00
9 1/2	200.00	202.00	1.00
9 3/4	205.00	207.00	1.00
10	210.00	212.00	1.00

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No Charge for Box or Cartage.
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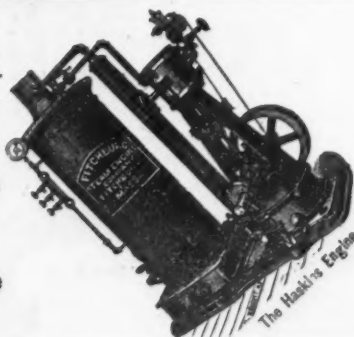
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CHEAP.

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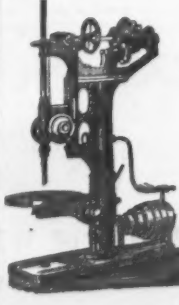
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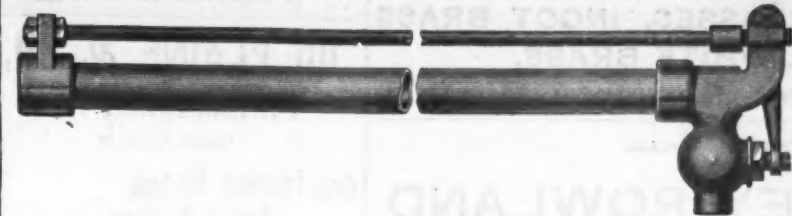
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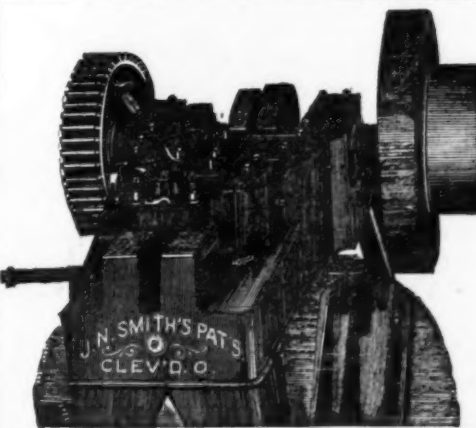
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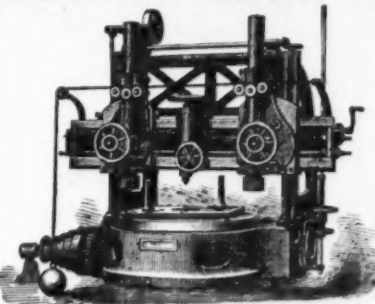
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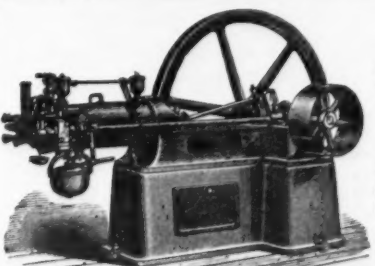
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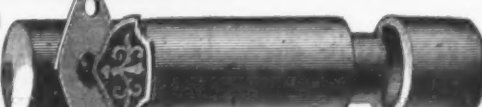
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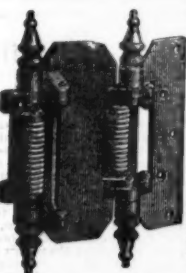
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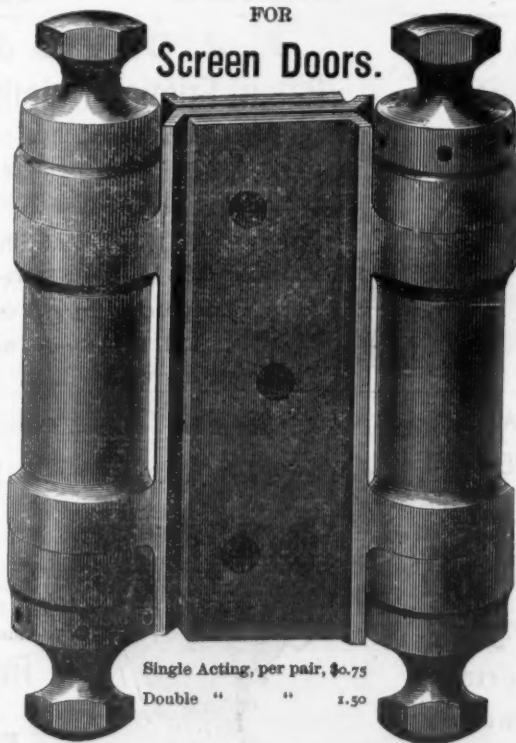
TRIAL OF THE IMPROVED LIGHTNING SAW.

The Emperor Dom Pedro, accompanied by Director General Godinho, Superintendent Albert, and others, visited Machinery Hall at the Centennial on the evening of June 28th. Among other things inspected, at the invitation of E. M. Boynton, of New York, they witnessed a trial of the New Lightning Saw, patented March 26, 1876. Two men, with one of these saws, cut off a sound log of gum-wood, one foot extreme diameter, in seven seconds, or at the rate of a cord of wood in five minutes. Messrs. Corliss, Morell, Lynch, and other members of the commission, witnessed the trial and timed the cutting. The Emperor remarked, "That was fast, very fast cutting." Last evening the Emperor made another examination of the saw.—Philadelphia Press, June 30.

"BOYNTON'S SAWS were effectually tested before the judges at the Philadelphia Fair, July 6th and 7th. An ash log, 11 inches in diameter, was sawed off, with a 1/4 foot lightning cross cut, by two men, in precisely 6 seconds, as timed by the chairman of the Centennial Judges of Class Fifteen. The speed is unprecedented, and would cut a cord of wood in 1 minute. The representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries, were present, and expressed their high appreciation." Received Medal and Highest Award of Centennial World's Fair, 1876. \$200 challenge was prominently displayed for six months, and the numerous saw manufacturers of the world dared not accept it, or test in a competition so hopeless.

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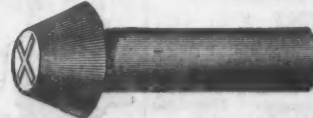


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